

## Decision on Petition for Rulemaking to Repeal 40 C.F.R. 122.3(a)

The Petition dated January 13, 1999, to the United States Environmental Protection Agency (“EPA”) for repeal of the regulation at 40 C.F.R. 122.3(a), submitted by the Pacific Environmental Advocacy Center, Center for Marine Conservation, San Francisco Bay Keeper, and a number of other concerned groups, is HEREBY DENIED for the reasons set forth below.

### Petition for Rulemaking

On January 13, 1999, the Pacific Environmental Advocacy Center submitted the Petition on behalf of a number of environmental organizations seeking the repeal of a regulation promulgated under the Clean Water Act (CWA) and published at 40 C.F.R. 122.3(a). That regulation provides:

The following discharges do not require National Pollutant Discharge Elimination System (NPDES) permits:

(a) Any discharge of sewage from vessels, effluent from properly functioning marine engines, laundry, shower, and galley sink wastes, or *any other discharge incidental to the normal operation of a vessel*. This exclusion does not apply to rubbish, trash, garbage or other such materials discharged overboard; nor to other discharges when the vessel is operating in a capacity other than as a means of transportation such as when used as an energy or mining facility, a storage facility or a seafood processing facility, or when secured to the bed of the ocean, contiguous zone or waters of the United States for the purpose of mineral or oil exploration or development.

40 C.F.R. 122.3(a)(emphasis added)(“normal operation exclusion” or “regulatory exclusion”). The Petition expresses particular concern regarding the italicized language to the extent it shields ballast water discharges containing non-indigenous aquatic nuisance species<sup>1</sup> from NPDES permit requirements. The Petition opens with the concern that the “introduction of non-indigenous species (NIS) through ballast water is significantly degrading aquatic resources throughout the United States.” Petition at 1. The Petition cites to congressional findings in the Non-indigenous Aquatic Nuisance Prevention and Control Act (“NANPCA”), 16 U.S.C.A. § 4701(a), and to the legislative history of the statute and its 1996 amendment, the National Invasive Species Act (“NISA”), Pub. L. No. 104-332, 110 Stat. 4073 (1996), to support the Petition’s claim regarding the significant adverse environmental and economic impacts caused by the release of exotic species in ballast water. Petition at 2-6.

The balance of the Petition seeks repeal of the NPDES normal operation exclusion based on legal arguments about the scope of permitting requirements under the Clean Water Act. The

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<sup>1</sup> Throughout this document and its attachments, EPA uses the terms “aquatic nuisance species,” “exotic species,” “non-indigenous species”, “invasive species”, and the acronyms “ANS” and “NIS” interchangeably.

Petition states that “vessels” are “point sources” requiring NPDES permits for discharges to waters of the United States (other than in the ocean and contiguous zone), Petition at 7, and that EPA has no authority to exclude point source discharges from vessels from the NPDES program. Petition at 2 & 8 (citing Natural Resources Defense Council v. Costle, 568 F.2d 1369, 1377 (D.C. Cir. 1977)). The Petition also contends that ballast water must be regulated under the NPDES program because it contains biological materials (e.g., invasive plant and animal species) and other pollutants (oil, chipped paint, sediment, and toxins in ballast water sediment). Petition at 6-7. Finally, the Petition argues that the recent enactment of the “Uniform National Discharge Standards for Armed Forces Vessels” in the National Defense Authorization Act for Fiscal Year 1996, Pub. L. No. 104-106, § 325(b) to (c)(2), 110 Stat. 254 (1996) demonstrates Congress’ recognition that EPA lacks a statutory basis for, and Congress’ tacit rejection of, the NPDES normal operation exclusion. Petition at 10.

### **Statutory and Regulatory Background**

#### **A. Clean Water Act**

The Clean Water Act (“CWA”), 33 U.S.C. §§ 1251 *et seq.*, is a comprehensive statute designed “to restore and maintain the chemical, physical, and biological integrity of the Nation’s waters” through reduction and eventual elimination of the discharge of pollutants into those waters. Section 101(a), 33 U.S.C. § 1251(a). As the primary means of achieving this goal, Congress established the National Pollutant Discharge Elimination System (NPDES) permitting program in Section 402 of the Act. 33 U.S.C. § 1342. Section 501(a) authorized the EPA Administrator to establish regulations to administer the program. 33 U.S.C. § 1361(a).

CWA Section 301(a) provides that “the discharge of any pollutant [from a point source] by any person shall be unlawful” without an NPDES permit. 33 U.S.C. § 1311(a). The term “point source” includes a “vessel or other floating craft.” 33 U.S.C. 1362(14). The definition of “discharge of a pollutant” means “(A) any addition of any pollutant to navigable waters from any point source, (B) any addition of any pollutant to the waters of the contiguous zone or the ocean from any point source other than a vessel or other floating craft.” 33 U.S.C. § 1362(12). Finally, the term “pollutant” excludes “sewage from vessels” and “a discharge incidental to the normal operation of a vessel of the Armed Forces.” 33 U.S.C. § 1362(6)(A)(including cross-reference to 33 U.S.C. § 1322))

EPA first promulgated the challenged regulation, including the normal operation exclusion, pursuant to notice and comment rulemaking procedures in 1973, shortly after enactment of the CWA. 38 Fed. Reg. 1362 (Jan. 11, 1973)(proposal); 38 Fed. Reg. 13528 (May 22, 1973)(final). The normal operation exclusion in the regulation was based on the legislative history of the CWA, which stated that “[The Conference Committee] would not expect the Administrator to require permits to be obtained for any discharges from properly functioning marine engines.” 38 Fed. Reg. at 1364 n.1 (quoting Congressional Record for Oct. 10, 1972 page E8454, Extension of Remarks). After Congress re-authorized and amended the CWA in

1977, EPA re-opened the NPDES normal operation exclusion regulation and invited additional public comment. 43 Fed. Reg. 37078 (Aug. 21, 1978). In 1979, EPA promulgated the final revision that established the NPDES normal operation exclusion regulation in its current wording. 44 Fed. Reg. 32854 (June 7, 1979).

B. Act to Prevent Pollution from Ships

The Act to Prevent Pollution from Ships (“APPS”) implements the provisions of the 1973 “International Convention for the Prevention of Pollution from Ships” (“MARPOL”) as supplemented by a 1978 Protocol and the Annexes to which the United States is party. 33 U.S.C. § 1901 *et seq.* The U.S. Coast Guard has primary responsibility to prescribe and enforce regulations necessary to implement APPS. MARPOL addresses certain discharges from ships and vessels, including a “discharge” and “garbage” and a “harmful substance” as those terms are defined in the relevant and applicable provisions of MARPOL. When it enacted APPS in 1980, Congress established a regulatory mechanism that is separate and distinct from the CWA to implement the MARPOL.

C. Non-indigenous Aquatic Nuisance Prevention and Control Act of 1990, as amended by the National Invasive Species Act of 1996

In 1990, Congress enacted legislation specifically to focus federal efforts on non-indigenous, invasive, aquatic nuisance species, specifically when such species occur in ballast water discharges. 16 U.S.C. § 4701 *et seq.* In doing so, Congress not only focused specific attention on the introduction of non-indigenous species in ballast water, but also attempted to coordinate activities of the federal government to develop and establish a federal research and technology development program for the control of the problem. The congressional purposes under the Non-indigenous Aquatic Nuisance Prevention and Control Act (“NANPCA”) were:

- (1) to prevent unintentional introduction and dispersal of nonindigenous species into waters of the United States through ballast water management and other requirements;
- (2) to coordinate federally conducted, funded or authorized research, prevention control, information dissemination and other activities regarding the zebra mussel and other aquatic nuisance species;
- (3) to develop and carry out environmentally sound control methods to prevent, monitor and control unintentional introductions of nonindigenous species from pathways other than ballast water exchange;
- (4) to understand and minimize economic and ecological impacts of nonindigenous aquatic nuisance species that become established, including the zebra mussel; and

(5) to establish a program of research and technology development and assistance to States in the management and removal of zebra mussels.

16 U.S.C. § 4701(b). Recognizing a deficit in research and technology to control such species, Congress established a program to “phase in” regulatory requirements for ballast water as necessary to control invasive species. The federal agency directed to lead this phased-in program was the U.S. Coast Guard.

The first phase of the regulatory program required the Secretary<sup>2</sup> of Transportation to issue voluntary guidelines to prevent the introduction and spread of aquatic nuisance species into the Great Lakes through the exchange of ballast water of vessels prior to entering those waters. 16 U.S.C. § 4711(a). Within two years, the Secretary was to impose controls on such introduction and spread via enforceable regulations. 16 U.S.C. § 4711(b). NANPCA also established the federal Aquatic Nuisance Species Task Force (“Task Force”), co-chaired by the Director of the U.S. Fish and Wildlife Service and the Under Secretary of Commerce for Oceans and Atmosphere, and including the Administrator of EPA, the Commandant of the U.S. Coast Guard, and the Assistant Secretary of the Army (Civil Works). 16 U.S.C. § 4721. This multi-agency Task Force was directed to develop and implement a program for aquatic nuisance species prevention, monitoring, control, education and research to be conducted or funded by the federal government. 16 U.S.C. § 4722. The Task Force was to include recommendations for funding to implement elements of the program, and to develop a demonstration program of prevention, monitoring, control, education and research for one specific aquatic nuisance, the zebra mussel. *Id.* In addition, the program focused on prevention and monitoring, with a heavy focus on research and education. *Id.* NANPCA authorized the expenditure of significant amounts for implementation, including over \$21 million for research under the Task Force programs. 16 U.S.C. § 4741. Congress directed the Task Force to report on its progress annually. 16 U.S.C. § 4722(k).

Congress re-authorized and amended NANPCA six years later with the National Invasive Species Act of 1996 (“NISA”). Pub. L. No. 104-332, 110 Stat. 4073 (1996). With NISA, Congress recognized that resolving the problems associated with aquatic nuisance species will require investment in the development of prevention technologies. 16 U.S.C. § 4701(15). NISA also added additional “phases” to the phased-in control program. First, NISA extended the ballast water exchange requirements applicable in the Great Lakes to waters of the Hudson River north of the George Washington bridge. 16 U.S.C. § 4711(a)(3). Second, NISA directed the Secretary to issue voluntary guidelines to prevent the introduction and spread of non-indigenous species in all waters of the United States (by ballast water operations and other operations of vessels equipped with ballast water tanks). 16 U.S.C. § 4711(c). The voluntary guidelines also

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<sup>2</sup> NANPCA defines “Secretary” to mean the Secretary of the department in which the U.S. Coast Guard is operating. 16 U.S.C. § 4702(10). Currently, the U.S. Coast Guard operates within the Department of Homeland Security. 6 U.S.C. § 113(c).

were now to include record-keeping and sampling provisions, and provide for variation in: vessel types; the characteristics of point of origin and receiving water bodies; the ecological conditions of waters and coastal areas of the United States; and different operating conditions. Id. Third, NISA required the Secretary to review the voluntary guidelines on a triennial basis, among other things, to assess the compliance rate with and the effectiveness of the voluntary guidelines. 16 U.S.C. § 4711(e). Fourth, if after the review the Secretary determines that the rate of effective compliance with the voluntary guidelines is inadequate, the Secretary would be required to promulgate regulations that make the voluntary guidelines for ballast water exchange into mandatory and enforceable requirements. 16 U.S.C. § 4711(f).

In compliance with NISA, the Coast Guard has established both voluntary guidelines and regulations to control the invasion of aquatic nuisance species. 33 C.F.R. Part 151 Subparts C & D. The voluntary guidelines urge the masters, owners, and operators of vessels to:

- (1) Avoid the discharge or uptake of ballast water in areas within or that may directly affect marine sanctuaries, marine preserves, marine parks, or coral reefs;
- (2) Minimize or avoid uptake of ballast water in the following areas and situations:
  - (i) Areas known to have infestations or populations of harmful organisms and pathogens (e.g., toxic algal blooms);
  - (ii) Areas near sewage outfalls;
  - (iii) Areas near dredging operations;
  - (iv) Areas where tidal flushing is known to be poor or times when a tidal stream is known to be more turbid;
  - (v) In darkness when bottom-dwelling organisms may rise up in the water column; and
  - (vi) Where propellers may stir up the sediment.
- (3) Clean the ballast tanks regularly to remove sediments. Clean the tanks in mid-ocean or under controlled arrangements in port, or at dry dock. Dispose of your sediments in accordance with local, State, and Federal regulations.
- (4) Discharge only the minimal amount of ballast water essential for vessel operations while in the waters of the United States.
- (5) Rinse anchors and anchor chains when [masters/owners/operators] retrieve the anchor to remove organisms and sediments at their place of origin.
- (6) Remove fouling organisms from hull, piping, and tanks on a regular basis and dispose of any removed substances in accordance with local, State and Federal regulations.

(7) Maintain a ballast water management plan that was developed specifically for the vessel.

(8) Train the master, operator, person-in-charge, and crew, on the application of ballast water and sediment management and treatment procedures.

33 C.F.R. 151.2035(a). In addition, for vessels that carry ballast water – that was taken on in areas less than 200 nautical miles from any shore or in waters less than 2000 meters deep -- into the waters of the United States after operating beyond the Exclusive Economic Zone (EEZ), the guidelines urge vessel masters, owners, and operators to:

(1) Exchange ballast water on the waters beyond the EEZ, from an area more than 200 nautical miles from any shore, and in waters more than 2,000 meters (6,560 feet, 1,093 fathoms) deep, before entering waters of the United States;

(2) Retain the ballast water on board the vessel;

(3) Use an alternative environmentally sound method of ballast water management that has been approved by the Coast Guard before the vessel begins the voyage; or

(4) Discharge ballast water to an approved reception facility.

33 C.F.R. 151.2035(b). The regulations also require non-exempted vessel masters, owners, or operators to submit ballast water management reports to the Coast Guard. 33 C.F.R. 151.2040 & Appendix to Subpart D.

As noted above, NISA requires ballast water treatment via mandatory mid-ocean ballast water exchange, or by a Coast Guard-approved alternative treatment method, for vessels entering the Great Lakes and the Hudson River north to the George Washington Bridge. 16 U.S.C. § 4711(a)(3). In March of 2002, the Coast Guard published an advance notice of proposed rulemaking and requested comments on standards for alternative treatment methods, specifically, standards for living organisms in ballast water discharges. 67 Fed. Reg. 9632 (Mar. 4, 2002).

In June of 2002, the Secretary of Transportation submitted a Report to Congress that determined that the rate of effective compliance with the voluntary guidelines was inadequate. The determination thus triggered NISA requirement, 16 U.S.C. § 4711(f), to promulgate regulations that make the voluntary guidelines for ballast water exchange into mandatory and enforceable requirements. The Coast Guard has proposed a rule that would establish these requirements. 68 Fed. Reg. 44691 (Jul. 30, 2003).

## **Bases for EPA's Response to the Petition**

In deciding to deny the Petition and not to reopen the NPDES normal operation exclusion for additional rulemaking, EPA based its decision on several factors.

First, there are significant practical and policy considerations that support EPA's decision not to re-open the regulation. There are many ongoing activities within the federal government related to control of invasive species in ballast water, many of which are likely to be more effective and efficient than reliance on NPDES permits under the CWA. In addition, use of NPDES permits would add a resource burden.

Second, the regulation is consistent with Congressional action since EPA promulgated the normal operation exclusion. Though the CWA does not explicitly exclude such discharges from permitting requirements, Congress has expressly considered EPA's long-standing and consistent interpretation of how to implement the "vessel or other floating craft" provisions of the CWA twice, first in 1979 and then again in 1996. In 1990, when Congress specifically focused on the problem of aquatic nuisance species in ballast water through enactment of other statutes, including the NANPCA as amended by NISA, it delegated authority to the Coast Guard to establish a phased-in regulatory program for ballast water. Congressional action and inaction regarding the NPDES normal operation exclusion and ballast water confirms legislative acquiescence to EPA's interpretation of the CWA.

Finally, the nearly 30 year old exclusion is narrowly tailored and has been consistently interpreted since enactment of the CWA; in responding to the Petition, EPA is not interpreting the statute for the first time. Essentially contemporaneous with enactment of the CWA, EPA interpreted the CWA to provide for regulation under NPDES of discharges from industrial operations on vessels (e.g., seafood processing facilities, or mineral or oil exploration)) and overboard discharges like rubbish, trash, or garbage, but not discharges "incidental to the normal operation of a vessel." EPA's interpretation is supported by long-standing administrative law principles.

### **A. Significant Practical and Policy Considerations Support EPA's Decision Not to Re-open the Regulation**

Analysis of the policy and practical implications of a repeal of the existing regulation demonstrates the reasonableness of EPA's interpretation. First, EPA believes its regulatory exclusion is reasonable in light of the many ongoing activities of EPA, the Coast Guard and other federal agencies to prevent the introduction of invasive species to aquatic ecosystems through ballast water discharges. EPA is working with other agencies (including the Coast Guard, the National Oceanic and Atmospheric Administration, and the Department of Defense) to increase awareness and capabilities of ballast water control programs; host national workshops designed to bring together scientists to discuss regional and national scientific issues related to nonindigenous species; foster research on invasive species and research and development of new

ballast water treatment technologies; and participate in international efforts to control invasive species as part of the U.S. delegation to the Marine Environmental Protection Committee of the International Maritime Organization. See Attachment 1, Current EPA Activities and Involvement in Ballast Water Issues.

Of greatest relevance to this decision, the Coast Guard is engaged in ongoing efforts to establish a quantitative ballast water treatment (“BWT”) performance standard, protocols for verifying and reporting on BWT technologies, and a program that will provide incentives for the experimental shipboard installation and operation of promising BWT technologies. The Coast Guard also has taken a series of four administrative steps with respect to BWT technologies. In May of 2001, the Coast Guard published a notice and request for comments in the Federal Register that discussed four possible approaches to setting standards for BWT. 66 Fed. Reg. 21807 (May 1, 2001). Later that month, the Coast Guard published a notice and request for comments on how a program of experimental BWT installation and testing might be structured so as to encourage participation by ship owners and operators. 66 Fed. Reg. 28213 (May 22, 2001). On June 12, 2001, EPA and the Coast Guard signed a Memorandum of Agreement establishing a formal engineering test program to accelerate the development and commercialization of ballast water treatment technologies. (See Attachment 2, Memorandum of Agreement Between the U.S. EPA Office of Research and Development and the U.S. Coast Guard on Collaborative Environmental Technology Verification, signed on June 12, 2001). In November of 2001, the Coast Guard published regulations requiring submission of ballast water management reports from all vessels equipped with ballast tanks that enter U.S. waters after operating beyond EEZ. 66 Fed. Reg. 58381 (Nov. 21, 2001). In addition, EPA is assisting the Coast Guard in the development of a BWT performance standard. On August 21, 2003, the two agencies entered into a Memorandum of Understanding (MOU) outlining their collaborative efforts in drafting the Environmental Impact Statement (EIS) for this standard. EPA will be a cooperating agency drafting portions of the EIS on affected environment and environmental consequences, and reviewing all other portions of the EIS consistent with the regulations at 40 CFR 1501.6, 1501.8 and the January 30, 2002 CEQ memorandum for the Heads of Federal Agencies (Subject: Cooperating Agencies in Implementing the Procedural requirements of the National Environmental Policy Act). Attachment 3: Memorandum of Understanding Between the US Coast Guard, Office of Marine Safety, Security and Environmental Protection and the US EPA, Office of Water for EIS activities under NEPA for NANPCA rulemaking, June, 2003.

Second, the Coast Guard is taking steps to maximize the use of existing ballast water management (“BWM”) techniques by all vessels, while fostering the development of new BWT technologies. First, the Coast Guard has proposed regulations to require all vessels equipped with ballast tanks that enter U.S. waters to submit a BWM report or face penalties established in NISA. 68 Fed. Reg. 523 (Jan. 6, 2003). Second, the Coast Guard will develop and administer a program to facilitate the development of effective BWT systems by providing conditional approval of experimental systems installed and tested onboard operating vessels. Third, the Coast Guard has proposed regulations requiring all vessels equipped with ballast water tanks that enter the waters of the U.S. after operating beyond the EEZ to perform some form of active

BWM. 68 Fed. Reg. 44691 (Jul. 30, 2003). Fourth, the Coast Guard will continue to develop a quantitative BWT performance standard. See Attachment 4, Report to Congress on the Voluntary National Guidelines for Ballast Water Management, USCG-2002-13147-2.

Third, EPA believes that regulation of all discharges incidental to the normal operation of a vessel, including discharges of ballast water, would be a massive undertaking, especially if an NPDES permit were required for all discharges from each such vessel. More than 31,000 voyages occur annually from beyond the exclusive economic zone (“EEZ”) into waters of the United States. Commercial cargo vessels of all flags made some 78,000 port calls in 1997, and there are more than 110,000 commercial fishing vessels and 16 million recreational boats in the United States. If Congress intended for EPA to issue NPDES permits for the incidental discharges from all these vessels, it could have questioned the normal operation exclusion in the almost 30 years since EPA promulgated it. Instead, Congress has established other regimes to address some of the excluded discharges and has supported the regulatory exclusion.

Finally, it is also important to note that States are not pre-empted by the CWA from acting to regulate discharges incidental to the normal operation of a vessel (other than an Armed Forces vessel pursuant to the Uniform National Discharge Standards at 40 C.F.R. 122.3(a) which is not a required element for State NPDES programs) See 40 C.F.R. 123.1(i)(2)(“Nothing in this part precludes a State from ... operating a program with a greater scope of coverage than that required under [the NPDES State program regulations].”). Further, under CWA Section 510 , States are not precluded from adopting more stringent requirements than Federal requirements. Thus, the NPDES regulations do not prohibit States from using NPDES permits to regulate ballast water or other discharges incidental to the normal operation of a vessel (other than an Armed Forces vessel). An NPDES-authorized State that identifies the discharge of invasive species in ballast water as a significant concern in its waters may act to address those discharges through its NPDES program.

B. EPA’s Regulation is Consistent with Congressional Action Addressing Discharges Incidental to the Normal Operation of Vessels Through Statutes other than the CWA

Petitioners also argue that when Congress excludes discharges from the NPDES program (sewage from vessels and incidental discharges from Armed Forces vessels), Congress specifically provides alternative programs for control of such discharges under the CWA, but Congress has not done so for all incidental discharges. Petition at 8. Petitioners overlook the fact that Congress has enacted programs to address some of the excluded discharges under other statutes, such as the NANPCA, as amended by the NISA, and the Act to Prevent Pollution from Ships. The NISA authorized and directed the Coast Guard to establish regulations for the control of invasive species in ballast water. Coast Guard rules provide for mandatory ballast water exchange for ships entering the Great Lakes from beyond U.S. waters, mandatory ballast water reporting and sampling for most vessels, and voluntary ballast water management guidelines for most vessels. The NISA required the Coast Guard to review the voluntary guidelines on a

triennial basis to assess the compliance rate with and the effectiveness of the voluntary guidelines. Upon a determination that the rate of effective compliance with the voluntary guidelines is inadequate, the Coast Guard would be required to promulgate regulations that make the voluntary guidelines for ballast water exchange into mandatory and enforceable requirements. In fact, the Coast Guard has made such a determination of inadequate compliance and has embarked on rulemaking for mandatory standards.

EPA believes it is appropriate to defer to the NANPCA/NISA's "phased-in" regulatory approach in the NANPCA (and the NISA), based on the apparent congressional desire for additional information gathering, as well as Congress' recognition of the current deficit in technological development of environmentally sound alternatives for ballast water management to prevent and control infestations of aquatic nuisance species. The NISA amendments directed the Secretaries of Interior and Commerce to "conduct a ballast water management demonstration program to demonstrate technologies and practices to prevent aquatic non-indigenous species from being introduced into and spread through ballast water in the Great Lakes and other waters of the United States." 16 U.S.C. § 4714(b)(1). In addition, Congress also directed location-specific regional research grants on aquatic nuisance species prevention and control. 16 U.S.C. § 4712(e). Given Congress' recognition of the technological challenges associated with control of aquatic nuisance species in ballast water, combined with the establishment of a regulatory program administered by the Coast Guard, EPA does not believe that Congress intended that EPA would repeal the normal operation exemption and begin implementation of a regulatory program like NPDES.

Similarly, and as noted above, the Act to Prevent Pollution from Ships, which implements MARPOL, designates the Coast Guard as the agency to prescribe and enforce regulations necessary to implement the APPS. MARPOL addresses certain discharges from ships. In the APPS, Congress established a regulatory mechanism that is separate and distinct from the CWA in order to implement domestic obligations under the MARPOL Convention and its Annexes. While the APPS contains a savings clause making clear that the APPS does not amend or repeal the Clean Water Act, EPA believes that Congress indicated its preference for regulatory control of routine, operational discharges from vessels by assigning that task to the Coast Guard.<sup>3</sup> EPA's normal operation exclusion for incidental discharges existed for seven years prior to enactment of the APPS.

Finally, in 2000, Congress enacted a stand alone title within the omnibus appropriations bill to prevent the unregulated discharge of treated sewage and graywater in certain areas of Alaska. See Making Omnibus Consolidated and Emergency Supplemental Appropriations for Fiscal Year 2001, Pub. L. No. 106-554, § 1401 ("Alaska Cruise Ship Legislation"). The Alaska Cruise Ship Legislation establishes specific limitations on the discharge of treated sewage and

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<sup>3</sup> The APPS also regulates certain discharges that are not routine, operational discharges, and that are also regulated under the CWA.

graywater in certain waters off of Alaska. Alaska Cruise Ship Legislation, §1404. By definition, the term “graywater” means galley, dishwasher, bath, and laundry waste water. Alaska Cruise Ship Legislation, §1414(4). EPA’s regulatory exclusion under the CWA extends to such graywater. Thus, when faced with a situation where unregulated graywater rose to the level of legislative concern, Congress did not repeal the Agency’s regulatory exclusion, nor did it amend the CWA. Instead, Congress established a separate statutory regime to address these specific discharges. Alaska Cruise Ship Legislation, § 1411(a).

These various statutory schemes and amendments demonstrate that Congress was aware of the Agency’s regulatory exclusion. Congress has chosen to regulate such discharges, in the first instance, elsewhere. Such Congressional acquiescence supports EPA’s conclusion that its longstanding interpretation of the CWA is reasonable and that the existing regulatory exclusion is consistent with the CWA. In determining whether Congress has specifically addressed the question of aquatic nuisance species in ballast water discharges incidental to the normal operation of a vessel, EPA does not confine itself to examination of the CWA in isolation, but instead reads the words of the CWA in their context and with a view to their place in the overall statutory scheme. Food & Drug Admin. v. Brown & Williamson Tobacco Corp., 529 U.S. 120, 132 (2000). The meaning of a statute may be affected by others, particularly where Congress has spoken subsequently and more specifically to the topic at hand. Id. at 133 (citing United States v. Estate of Romani, 523 U.S. 517, 530-31 (1998) & United States v. Fausto, 484 U.S. 439, 453 (1988)).

C. EPA’s Longstanding Regulation is Reasonable and Authorized by the CWA

The regulatory exclusion is a narrow one, designed to address only discharges which are incidental to the “normal operation” of a vessel. All other discharges from vessels to the navigable waters (with the exception of sewage, which is regulated under CWA Section 312) remain subject to NPDES jurisdiction. By its terms, the exclusion does not apply to discharges of pollutants that are not “incidental to the normal operation of a vessel,” such as “discharges when the vessel is operating in a capacity other than as a means of transportation such as when used as an energy or mining facility, a storage facility or a seafood processing facility. . . .” 40 CFR 122.3(a). EPA believes that this type of narrow exclusion comports with Congressional intent. While the Petition essentially argues that the language of the CWA does not permit EPA any flexibility to define “discharges incidental to the normal operation of a vessel” as not requiring permits, the legislative history, in fact, indicates otherwise. “[The Conference Committee] would not expect the Administrator to require permits to be obtained for any discharges from properly functioning marine engines.” Congressional Record for Oct. 10, 1972 page E8454 (Extension of Remarks; Congressman Robert E. Jones of Alabama).

Moreover, in light of the structure of the NPDES program established by Congress, EPA believes the existing regulatory exclusion reasonably implements Congress’ intent with respect to regulation of discharges from vessels under the CWA. The NPDES program is largely implemented by States, Territories, or Tribes authorized by EPA to operate their own NPDES

programs under State, Territorial, or Tribal law. At present, EPA has approved 45 States and the U.S. Virgin Islands to administer the NPDES permitting programs. In the remaining States, Territories, and Indian country, EPA administers the NPDES program. States are not required to administer NPDES programs that are identical to those of the Federal government, but rather only programs that meet minimum Federal requirements. State regulations, therefore, frequently differ from those of the Federal government and from other States. Once a State receives authorization to administer the NPDES program, EPA must stop issuing NPDES permits in that jurisdiction. Section 402(c), 33 U.S.C. § 1342(c). NPDES agencies can provide permit authorization under either an individual permit (which covers a single discharger) or under a general permit (which covers a number of similar dischargers, usually within a specified geographic area). NPDES permits must contain technology-based limits, and any more stringent limits as necessary to meet State water quality standards. Section 301(b)(1)(C), 33 U.S.C. § 1311(b)(1)(C). Because most States administer the NPDES program, EPA does not have authority to issue permits in these States to provide nationally uniform or standardized permit requirements for discharges incidental to the normal operation of a vessel in these States' waters.<sup>4</sup>

EPA reasonably interprets the CWA to authorize the exclusion of discharges incidental to the normal operation of a vessel because otherwise every vessel engaged in interstate commerce would be required to apply for and obtain a different, and potentially conflicting, NPDES permit for each of the various State waters through which they travel. There is no provision under the CWA that would enable EPA to issue any type of general permit to establish consistent, nationwide standards for vessels in State waters. Under Section 303 of the CWA, States have adopted varying water quality standards. 33 U.S.C. § 1313. Given the structure of the CWA permitting and standards provisions, and the nature of incidental discharges from vessels, EPA's interpretation of the CWA not to require an NPDES permit for every discharge from a vessel that simply operates normally as a means of transportation in the navigable waters avoids the burden of different, and potentially conflicting, requirements from every State through which such a vessel passes.

The Petition argues that under existing case law, EPA did not have the authority to promulgate the normal operation exclusion at 40 C.F.R. 122.3(a). Petition at 7-8. The Petition

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<sup>4</sup>After EPA authorizes a State to administer the NPDES program, EPA must suspend its issuance of permits in such a State. 33 U.S.C. § 1342(c)(1). EPA's authority to issue permits in authorized States is limited to situations where EPA objects to the permit issued by an authorized State, and the State declines to modify the permit to meet the objection. 33 U.S.C. § 1342(d)(4). While EPA *could* object to all permits for normal operation vessel discharges issued by authorized States (assuming EPA had a reasoned basis to do so), any resulting EPA-issued NPDES permits would not be uniform or standardized because each of the various States have established differing water quality standards, with which such permits would need to assure compliance.

cites to NRDC v. Costle, in which the D.C. Circuit found that “[t]he wording of the statute, the legislative history, and precedents are clear: the EPA Administrator does not have authority to exempt categories of point sources from the permit requirements of § 402.” 568 F.2d 1369, 1377 (D.C. Cir. 1977). Contrary to the Petition’s implied suggestions, the normal operation exclusion does not exempt a category of point sources from NPDES permitting requirements. Rather, the regulation narrowly excludes only some types of discharges from vessels from NPDES requirements. Vessels, as a category, remain point sources otherwise subject to Section 402 of the Act.

Under established administrative law principles, to uphold an agency’s interpretation of a statute it administers, a court need only conclude that the agency’s construction is a reasonable interpretation of the relevant provisions; it does not need to find that an agency’s statutory construction is the only reasonable one, or even that it is the result the court would have reached had the question arisen in the first instance in judicial proceedings. Aluminum Company of America v. Central Lincoln Peoples’ Utility District, 467 U.S. 380, 389 (1984)(citations omitted); Chemical Mfrs. Ass’n v. Natural Resources Defense Council, 470 U.S. 116, 125 (1985) (EPA’s view of the Clean Water Act is “entitled to considerable deference; and to sustain it, we need not find that it is the only permissible construction that EPA might have adopted but only that EPA’s understanding of this very ‘complex statute’ is a sufficiently rational one to preclude a court from substituting its judgment for that of EPA.”). The courts have identified five factors which generally support giving great deference to an agency interpretation: the interpretation is by the regulatory agency charged with administering the statute; the interpretation is issued contemporaneously with passage of the statute; the agency interpretation has been consistent; the statute requires, and the interpretation reflects, the agency’s particular expertise; there is a thorough record of the interpretation; and there has been congressional acquiescence to the interpretation. In this case, all five factors support granting substantial deference to EPA’s interpretation of the CWA to support the regulatory “normal operation” exclusion at 40 C.F.R. 122.3(a).

As a general rule, courts must give “great deference to the interpretation given the statute by the officers or agency charged with its administration.” EPA v. National Crushed Stone Association, 449 U.S. 64, 83 (1980) (quoting Udall v. Tallman, 380 U.S. 1, 16 (1965)). EPA has responsibility for administering and interpreting the CWA. The D.C. Circuit has held that Congress expressly meant that EPA should have substantial discretion in administering the CWA, including the power to interpret the definitional provisions of the Act. NWF v. Gorsuch, 693 F.2d 156, 167 (D.D.C. 1982)(“Congress expressly meant EPA to have not only substantial discretion in administering the Act generally, but also at least some power to define the specific terms “point source” and “pollutant.”). Further, the Act specifically provides authority for the Administrator “to prescribe such regulations as are necessary to carry out his functions” under the CWA. CWA Section 501(a), 33 U.S.C. § 1361(a).

EPA interpreted the CWA to exclude from NPDES regulation those discharges incidental to the normal operation of a vessel essentially contemporaneously with enactment of the CWA.

The CWA was enacted in October 1972. EPA proposed the normal operation exclusion in January 1973 and promulgated the regulation in May 1973. Such contemporaneous construction is entitled to increased deference. NWF v. Gorsuch, 693 F.2d at 167; Commodity Futures Trading Commission v. Schor, 478 U.S. 833, 844 (1986)(“as the CFTC’s contemporaneous interpretation of the statute it is entrusted to administer, considerable weight must be accorded the CFTC’s position”); Aluminum Company of America, 467 U.S. at 390; Federal Housing Administration v. Darlington, Inc., 358 U.S. 84, 90 (1959).

The normal operation exclusion at 40 C.F.R. 122.3(a) has been the Agency’s implementing regulation for nearly 30 years, essentially since enactment of the CWA. Even though the Agency re-opened and revisited the regulation, EPA has consistently maintained the underlying interpretation. For instance, in 1979, the Agency promulgated an amendment to the regulation clarifying that the exclusion does not extend to vessels operating as energy, mining or seafood processing facilities or to secured vessels used for mineral or oil exploration or development. 44 Fed. Reg. at 32859 (June 7, 1979). Longstanding interpretations of statutes are entitled to particular deference. Barnhart v. Walton, 535 U.S. 212, 220 (2002)(citing North Haven Bd. of Educ. v. Bell, 456 U.S. 512, 522, n.12 (1982)); NWF v. Gorsuch, 693 F.2d at 167 (citing Zenith Radio Corp. v. United States, 437 U.S. 443, 450 (1978)).

Courts have acknowledged the need for deference to EPA’s interpretation of the CWA in light of “the complexity and technical nature of the statutes and the subjects they regulate . . . and EPA’s unique experience and expertise.” E.I. du Pont de Nemours & Co. v. Train, 430 U.S. 112, 135, n.25 (1977) (internal quotes omitted). Such expertise is due substantial deference even when the question is one of statutory interpretation and jurisdiction. Schor, 478 U.S. at 845 (“An agency’s expertise is superior to that of a court when a dispute centers on whether a particular regulation is reasonably necessary to effectuate any of the provisions or to accomplish any of the purposes of the Act the agency is charged with enforcing; the agency’s position, in such circumstances, is therefore due substantial deference.” (internal quotes omitted)). In response to the Petition, EPA prepared (and invited public comment on) a report entitled “Aquatic Nuisance Species in Ballast Water Discharges: Issues and Options,” which explores the complex technical and policy issues surrounding the question of how best to address the discharges which are at the center of the Petition. 66 Fed. Reg. 49381 (Sept. 27, 2001) & Attachment 5.

The thoroughness of the Agency’s position is demonstrated by the fact that the Agency went through notice and comment procedures at least twice to examine the nature of the regulatory exclusion. In both 1973 and 1978, the public had the opportunity to comment on the exclusion. 38 Fed. Reg. 1362, 1363-64 (Jan. 11, 1973); 38 Fed. Reg. at 13528 (May 22, 1973); 43 Fed. Reg. at 37079 (Aug. 21, 1978).

Finally, Congress has been aware of and has supported the Agency’s longstanding interpretation of the CWA. “Where ‘an agency’s statutory construction has been fully brought to the attention of the public and the Congress, and the latter has not sought to alter that interpretation although it has amended the statute in other respects, then presumably the

legislative intent has been correctly discerned.” North Haven Bd. of Education v. Bell, 456 U.S. at 535 (1982) (quoting United States v. Rutherford, 442 U.S. 544, 554, n.10 (1979) (internal quotes omitted)).

Since passing the CWA in 1972, Congress has enacted two statutes relevant to the regulation exempting discharges incidental to the normal operation of a vessel. In doing so, Congress specifically acknowledged the regulation, and did not act to ratify, repeal, or revise it. Therefore, Congress has acquiesced to the regulation.

Congress’ first opportunity to consider the NPDES regulation at issue followed EPA’s 1979 regulatory revision, when the Agency described some types of “vessels” that are not used for the primary purpose of transportation, and thus not exempt from NPDES permitting requirements. In the Deep Seabed Hard Mineral Resources Act, Congress explicitly ratified the portion of the regulation that asserts CWA jurisdiction over discharges from industrial operations on a “vessel or other floating craft.”<sup>5</sup> 30 U.S.C. § 1419(e). In crafting this provision, the relevant Senate Committee Report considered the NPDES vessel regulation in its entirety. S. Rep. No. 96-300, at 2 (1979).

After EPA clarified the normal operation exclusion does not apply to discharges from industrial operations of vessels, Congress explicitly ratified that portion of the regulation. In doing so, the legislative history also demonstrates congressional acknowledgment of the entire regulation, which excludes discharges incidental to the normal operation of a vessel. S. Rep. No. 96-300, at 2 (1979). The legislative history also demonstrates that Congress did not believe that the current version of the CWA unambiguously addressed the issue stating that “the 1972 and 1977 Amendments to the Federal Water Pollution Control Act (FWPCA) did not speak specifically” to the scope of what discharges Congress intended would be regulated with reference to a “vessel and other floating craft.” *Id.* at 3. Because Congress expressly acknowledged the NPDES normal operation exclusion regulation and chose not to ratify, repeal, or otherwise amend the remaining portions of it, Congress acquiesced to the regulation.

Congress similarly acknowledged and acquiesced to the NPDES normal operation exclusion when it established discharge standards for Armed Forces vessels. In 1996, Congress enacted the National Defense Authorization Act for Fiscal Year 1996, Pub. L. No. 104-106, § 325(b) to (c)(2), 110 Stat. 254 (1996). This Act amended the CWA explicitly to exclude a “discharge incidental to the normal operation of a vessel of the Armed Forces” from the

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<sup>5</sup> The legislation provides that “For the purposes of this chapter, any vessel or other floating craft engaged in commercial recovery or exploration shall not be deemed to be “a vessel or other floating craft” under Section 502(12)(B) of the Clean Water Act and any discharge of a pollutant from such vessel or other floating craft shall be subject to the Clean Water Act.” 30 U.S.C. § 1419(e).

definition of “pollutant.” 33 U.S.C. § 1362(6). It also provided for Uniform National Discharge Standards (“UNDS”) for discharges incidental to the normal operation of vessels of the Armed Forces. CWA Section 312(n), 33 U.S.C. § 1322(n).

In addition, in the UNDS legislative history, Congress explicitly stated: “The [*CWA*] and implementing regulations currently exempt incidental vessel discharges from permitting requirements. Incidental discharges remain subject to varying state regulation.” S. Rep. 104-112 at p. 211 (emphasis added). This legislative history indicates that not only was Congress aware of the regulatory exemption, but also that Congress believed that both the regulations and the CWA excluded incidental discharges and that Congress supported EPA’s implementation of the CWA through the regulatory exclusion. Compare Schor, 478 U.S. at 846 (quoting NLRB v. Bell Aerospace Co., 416 U.S. 267, 274-275 (1974)) (“It is well established that when Congress revisits a statute giving rise to a longstanding administrative interpretation without pertinent change, the ‘congressional failure to revise or repeal the agency’s interpretation is persuasive evidence that the interpretation is the one intended by Congress.’”). Congress comprehensively revisited the CWA three times in the 30 years since it was enacted (1977, 1981, and 1987) and has not repealed the Agency’s longstanding interpretation. In fact, in amending the CWA to ensure that States cannot regulate incidental discharges from Armed Forces vessels, Congress has not merely been silent as to the Agency’s construction of the statute, it has amended the statute assuming the validity of the Agency’s interpretation.

Petitioners argue that the statutory exemption for discharges incidental to the normal operation of an Armed Forces vessel demonstrates that Congress tacitly rejected EPA’s more broadly drawn exemption. Petition at 10. Petitioners argue that Congress would only have acted to exclude such Armed Forces discharges if it believed such discharges were covered by the NPDES program. To the contrary, the UNDS legislative history demonstrates Congress’ knowledge, and approval, of the exclusion. Congress could have amended the statute and/or expressed disapproval with the regulation, but instead Congress acknowledged EPA’s authority to address these discharges through the regulatory exclusion. In addition, Congress acted to exclude incidental discharges from Armed Forces vessels not because Congress questioned the regulatory exclusion, but because Congress wanted to prevent such discharges from being subject to inconsistent *State* regulation. Operation of the then-existing regulatory exclusion meant only that incidental discharges from Armed Forces vessels did not require federally-issued NPDES permits. As explained above, however, the NPDES program is largely implemented by States authorized by EPA to operate their own NPDES programs under State law and the normal operation exclusion was not a required<sup>6</sup> element for State NPDES programs. Thus, EPA believes Congress amended the CWA to expressly preclude State regulation and to ensure that incidental discharges from Armed Forces vessels were not subject to inconsistent

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<sup>6</sup> As it relates to Armed Forces vessels, the “normal operation” exclusion now applies automatically to State NPDES programs via the pre-emptive effect of UNDS.

State regulation, but to preserve the ability for States to regulate any other vessels under State law.

**Conclusion**

For the foregoing reasons, the Petition for repeal of 40 C.F.R. 122.3(a) is denied.

Dated: September 2, 2003

/S/

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Marianne Lamont Horinko  
Acting Administrator

**Attachments:**

Attachment 1: Current EPA Activities and Involvement in Ballast Water Issues.

Attachment 2: Memorandum of Agreement between US EPA Office of Research and Development and the US Coast Guard on Collaborative Environmental Technology Verification, Signed June 21, 2001.

Attachment 3: Memorandum of Understanding Between the US Coast Guard, Office of Marine Safety, Security and Environmental Protection and the in US EPA, Office of Water for EIS activities under NEPA for NANPCA rulemaking, June 2003.

Attachment 4: Report to Congress on the Voluntary National Guidelines for Ballast Water Management.

Attachment 5: Aquatic Nuisance Species in Ballast Water Discharges: Issues and Options.

## Attachment 1

### Current EPA Activities and Involvement in Ballast Water Issues

EPA recognizes that the discharge of invasive species from ballast water is a serious threat to the environment. The impacts of invasive species are costly and often irreversible. EPA is working closely with stakeholders, States and other Federal agencies to help control invasive species and prevent future invasions.

#### EPA and Coast Guard Activities

The EPA is working closely with the Coast Guard to develop supporting documents for ballast water regulations that the Coast Guard is developing under the Nonindigenous Aquatic Nuisance Species Control Act, as amended by the National Invasive Species Act. Most recently, the EPA worked with the Coast Guard to develop a Programmatic Environmental Assessment (PEA) for the Coast Guard's Mandatory Ballast Water Management Program. The Coast Guard is preparing to propose regulations for a Mandatory Ballast Water Management Program, which would require ballast water management for all vessels equipped with ballast tanks entering U.S. waters after operating outside of the Economic Exclusive Zone (EEZ). The PEA identifies the potential for environmental impacts of the proposed rulemaking. EPA is also beginning to work with the Coast Guard on an Environmental Impact Statement (EIS) for an upcoming Coast Guard rulemaking proposal to establish Standards for Living Organisms in Ship's Ballast Water Discharged in U.S. Water. EPA will perform duties as a cooperating agency (under the National Environmental Policy Act) in addition to the agencies traditional duties as a reviewer of the EIS. Public meetings will be held in Fall 2003 regarding the EIS.

#### Environmental Technology Verification Program

EPA's Environmental Technology Verification (ETV) Program develops testing protocols and verifies the performance of innovative technologies that have the potential to improve protection of human health and the environment. EPA created the ETV program to accelerate the entrance of new environmental technologies into the domestic and international marketplace. Currently, the ETV program is developing protocols for testing, verifying and reporting on new ballast water treatment technologies. Since FY 2001, EPA has contributed \$160K to the program. [Note: this last sentence doesn't sound right. Do we mean that EPA has "allocated" the money (i.e., from appropriated funds)? Has Congress earmarked the money (in which case, the line would be that "Congress has appropriated" the money. Given that it is an EPA program, it doesn't sound right to say EPA has contributed to it.)]

#### International Maritime Organization (IMO)

In 1997, the IMO adopted voluntary ballast water management guidelines to minimize the transfer of harmful aquatic organisms and pathogens. Members of the Ballast Water Working Group of the Marine Environmental Protection Committee (MEPC) of the IMO are now attempting to draft an international agreement that would make the management of ballast water discharges mandatory. EPA actively participates as a member of the U.S. delegation in the

preparations for, and the negotiations during, the meetings of the Ballast Water Working Group of the MEPC of the IMO. In April 2001 the MEPC considered a draft text of an international ballast water instrument drafted by the United States. The U.S. draft was accepted by the MEPC as the base document for further development of the treaty. In addition, over the next year, the U.S. delegation is coordinating an international correspondence group to help develop an effective international standard. The U.S. delegation has taken on the role to chair an intercessional standards drafting group, because the United States government believes that development of an effective international standard is necessary, and should be the basis of this agreement. The United States will need to address potential limitations on individual States (domestic States of the U.S. or foreign nation "States"?) concerning the regulation of ballast water discharges in their jurisdictions. Domestic implementation of this instrument is expected to be accomplished through existing domestic legislation. In October 2002, the MEPC continued negotiations of the ballast water treaty. During this session, the MEPC agreed that the performance standard should not be based on the percentage of viable organisms removed, but on the number of organisms per unit volume. A new convention adopting these latest agreements could be adopted as soon as 2004.

#### Aquatic Nuisance Species Task Force

EPA is a member of the Aquatic Nuisance Species Task Force (ANSTF). Under NISA, the ANSTF is an intergovernmental organization dedicated to preventing and controlling aquatic nuisance species. The U.S. Fish and Wildlife Service and the National Oceanic and Atmospheric Administration (NOAA) co-chair the ANSTF, which consists of seven Federal agency representatives (including EPA) and 11 *ex officio* members. The ANSTF coordinates government efforts dealing with invasive species in the United States with those of the private sector and other North American interests. EPA has been involved in various sub-committees within the ANSTF, including the Ballast Water and Shipping Committee and the Ballast Water Program Effectiveness and Adequacy Criteria Committee. Under the auspices of the Ballast Water and Shipping Committee, the Coast Guard and EPA have established a formal collaborative engineering test program to verify the effectiveness of ballast water treatment technologies. The Ballast Water Program Effectiveness and Adequacy Criteria Committee recommends criteria for assessing whether the requirements and guidelines implemented by the U.S. Coast Guard program are effective at reducing the risk of species invasion.

#### National Invasive Species Council

EPA is also a member of the National Invasive Species Council (NISC) and participates in its efforts to control invasive species introductions. The Council was established under Executive Order 13112 and is co-chaired by the Secretaries of Interior, Agriculture and Commerce, with membership including the Administrator of EPA and Secretaries of Defense and Transportation. The Council is charged with (1) overseeing the implementation of the order by Federal agencies; (2) developing guidance for Federal agencies and making recommendations for international cooperation; and (3) preparing a National Invasive Species Management Plan. The NISC released its final Invasive Species Management Plan (Plan) on January 18, 2001, and that Plan directs EPA and certain other Federal agencies to take a number of actions. These actions include sponsoring research to develop new technologies for ballast water management,

and the development of standards by the Coast Guard for approving ballast water management technologies. Early detection and rapid response is another major action in the Plan. The early detection of potential invasions, and the rapid eradication or containment of invasive species is the goal of this action. The Plan directs EPA, USDA, DOI, and DOC to institute systematic monitoring surveys of locations where introductions are most likely to occur by 2003. The surveys will be developed in cooperation with Federal, State, local, and Tribal authorities.

### National Estuary Program

Congress established the National Estuary Program (NEP) in 1987 to identify nationally-significant estuaries threatened by pollution, development, and overuse, and promote effective management that will lead to the conservation of these important ecosystems. Under the program, there are currently 28 such estuaries identified for NEPs. The San Francisco Estuary Project and the Puget Sound Water Quality Action Team are two NEPs that have identified aquatic nuisance species as a priority issue in their Comprehensive Conservation and Management Plans. Several other NEPs, such as Tampa Bay, Massachusetts Bays, Barataria-Terrebonne, Delaware Inland Bays, and Narragansett target aquatic nuisance species in their annual workplans as well. The San Francisco Bay NEP has developed an aquatic nuisance species monitoring program that is likely to serve as a model for other estuaries that are vulnerable to invasive species invasions via ballast water. Because a number of major ports are located in estuaries, EPA is working to support the development of effective research and monitoring programs in the NEPs. In FY 2000, EPA provided special funding in support of aquatic nuisance species activities to the San Francisco NEP, the Puget Sound Water Quality Action Team, the Massachusetts Bays NEP, and the Tampa Bay NEP. In addition, EPA funded a number of NEP programs in FY 2002 which addressed aquatic nuisance species. The funding supports work ranging from the development of rapid response and monitoring programs to efforts which seek to control invasive species in specific estuaries.

### Interagency Committee on the Marine Transportation System

EPA also participates on the Interagency Committee on the Marine Transportation System (ICMTS), a Federal interagency partnership responsible for the Nation's Marine Transportation System (MTS) - waterways, ports and their intermodal connections (i.e. railroads, highways). The ICMTS coordinates overlapping Federal agency functions in the management of that system. The management and potential regulation of ballast water is a salient issue for the constituents and managers of the MTS, so this committee follows the activities of the participating Federal agencies who address ballast water introductions of nonindigenous species, both at the national and international level.

## Office of Wetlands, Oceans and Watersheds (OWOW) Invasive Species Strategy

A number of programs administered by EPA's Office of Water deal with invasive species issues. The programs are aimed at contributing to the control and prevention of invasive species. The purpose of the strategy is to improve the effectiveness of the programs and establish appropriate leadership, partnership and educational roles in the invasive species management community. The plan is divided into a number of different stages in order to appropriately achieve the goals of the strategy. Phase I of the Strategy was completed in March 2003, defining and outlining the objectives of the strategy. Phase II is scheduled to be completed in August 2003. Phase II will begin to identify the priority action items for OWOW.

# MEMORANDUM OF AGREEMENT

Between

**THE U.S. ENVIRONMENTAL PROTECTION AGENCY  
OFFICE OF RESEARCH AND DEVELOPMENT  
NATIONAL RISK MANAGEMENT RESEARCH LABORATORY and  
NATIONAL EXPOSURE RESEARCH LABORATORY  
ENVIRONMENTAL TECHNOLOGY VERIFICATION PROGRAM**

And

**THE U.S. COAST GUARD**

On

**COLLABORATIVE ENVIRONMENTAL TECHNOLOGY VERIFICATION**

## **ARTICLE I. OBJECTIVE**

### **A. BACKGROUND**

This Memorandum of Agreement (MOA) establishes the goals and administrative methods that will facilitate cooperation and coordination between the U.S. Environmental Protection Agency's Office of Research and Development (EPA-ORD) [specifically the National Risk Management Research Laboratory (NRMRL) and the National Exposure Research Laboratory (NERL) through the Environmental Technology Verification Program] and the U.S. Coast Guard (USCG), jointly referred to as the "Parties". It is intended to facilitate collaborative technology testing, verification, reporting, and technology transfer activities with particular emphasis on environmental technologies of interest to both Parties. This cooperation may also include local, state, and other Federal agencies; colleges and universities; industry; and public interest groups, as the Parties agree and as permitted by law and regulation.

1. EPA. The U.S. Environmental Protection Agency's Environmental Technology Verification Program (ETV) is designed to accelerate the development and commercialization of improved environmental technology through third-party verification and reporting of performance. The goal of ETV is to verify the performance characteristics of commercial-ready environmental technologies through the generation and evaluation of objective and quality-assured data so that potential purchasers and permittees are provided with an independent and credible assessment of the technology that they are buying or permitting. ETV is intended to expand the environmental technology choices of public and private decision makers, both in our country and abroad.

The ETV program now operates six centers covering a broad range of environmental areas. In these centers, EPA utilizes the expertise of not-for-profit, private-sector "verification organizations" to design efficient processes for conducting performance tests of innovative technologies. Verification organizations oversee and report verification activities based on testing and quality assurance protocols developed with input from all major stakeholder/customer groups associated with the area. The six centers cover the following technology areas: Advanced Monitoring Technologies; Air Pollution Control Technologies; Drinking Water Systems; Greenhouse Gas Technologies; Pollution Prevention, Recycling and Waste Treatment Technologies; and Water Protection Technologies.

ETV has established certain operational quality criteria that maintain the program's essential values of fairness to all participants, credibility of all information, transparency of operation and outcome, and quality assurance throughout all activities. These operational quality criteria are:

- ETV supported activities will be open to all commercial ready technologies within each tested category.
- ETV supported activities will assure that all testing organizations are independent third parties with no financial or other interests in the technology.
- ETV supported activities will function on the basis of test plans and protocols that are publicly available prior to testing.
- ETV supported activities will publicly report testing results for each technology tested.
- ETV supported activities will maintain and implement quality management plans that assure the production and publication of the highest quality data and information.

In addition to the above, the ETV program relies heavily on the ongoing participation of stakeholders representing all points of view within a given environmental area. Stakeholders assure that the most important questions concerning a technology's performance are addressed and that the test plans and protocols selected or developed to acquire these data are appropriate and meaningful for the marketplace. The program is fully committed to controlling the costs of testing while producing high quality data and to maximizing the availability of information on verified technologies through rapid publication of reports and verification statements. The ETV website, [www.epa.gov/etv](http://www.epa.gov/etv), provides information on the activities of EPA and its cooperative partners, and is the primary means of outreach and information distribution for the ETV program.

These criteria and general operating parameters will be maintained in all activities undertaken through this agreement.

2. USCG. The USCG's interest in environmental technology innovation is manifested through a variety of applied research efforts directly supporting its Marine Safety and Environmental Protection Program. Performed through the USCG Research and Development Center in Groton, CT at the request of Headquarters programs, this work has traditionally been in the areas of pollution prevention technology, oil and hazardous material spill response technology, and environmental compliance for USCG controlled and regulated vessels and facilities. To implement the National Invasive Species Act of 1996 (NISA), the USCG has added invasive species to its areas of research, with an initial focus on fostering the development of ballast water treatment technologies for shipboard installation.

A number of potential ballast water treatment technologies are being investigated worldwide by government, industry, academic and non-governmental interests. Included in this list are filtration, hydrocyclonic separation, and chemical and physical biocides (i.e. ozone, chlorine, ultraviolet radiation heat treatment, and vacuum). However, none of these has yet been proven to be effective in a shipboard application, and the absence of standards and protocols by which to evaluate new technologies complicates development efforts. The USCG is interested in participating in a program that will lead to the development of protocols for testing and evaluating proposed ballast water treatment systems.

The collaborative projects initiated under this MOA will be mutually beneficial and will result in the verification of environmental technologies that will be used to enhance environmental protection.

## **B. AUTHORITY**

This MOA is authorized under the provisions of 14 U.S.C. § 141.

## **C. PURPOSE**

The purpose of this MOA is to facilitate the development of appropriate mechanisms and to set forth basic understandings of relationships and responsibilities between the Parties in order to permit the USCG and EPA to utilize the expertise residing in each organization to cooperatively and collaboratively assess the performance of environmental technologies of interest to both agencies. By leveraging the technological and scientific strengths of the two agencies and by integrating complementary activities, collaborative projects may be initiated which are of mutual interest. Benefits anticipated from this MOA include:

- Improved effectiveness and efficiency in the conduct of environmental technology evaluation, testing and verification;
- Maximizing the use of the capacity of each organization in environmental technology evaluation, testing and verification;
- Jointly reporting on technology performance; and,
- More widespread communication and acceptance of the results of joint environmental technology verification reports.

While this MOA is focused on exploring opportunities for joint USCG and EPA activities, both Parties clearly acknowledge that each has an overriding interest in assuring the accomplishment of its own mission, and in assuring the availability of its own facilities and other resources for the performance of its mission. This MOA is based on the premise that despite the obvious precedence of each agency's own mission, there are situations in which such sharing can actually increase the effectiveness of each agency's ability to accomplish its mission.

#### **D. METHODS OF COOPERATION**

1. The USCG and EPA agree to seek out opportunities to enter into support agreements (SAs) to perform technology testing and verification that are of mutual interest and that will be based on and cite appropriate statutory authority, and that adhere to FAR 6.002 and FAR Subpart 17.5, and other applicable Federal laws and regulations. SAs may provide for sharing of facilities, costs and other resources as the Parties agree. SAs may provide for the use of facilities, personnel, cooperative projects, transfer of funds, and peer review of plans and results.
2. When a USCG or an EPA contractor or cooperator is to perform part of the work, either the USCG or the EPA may designate representatives to serve as Technical Monitors or Project Officers to communicate directly with the EPA or the USCG's contractor or cooperator within the approved scope of the task. However, only the representative(s) of the contracting agency may direct activity by or of the contractor. EPA or the USCG's staff members that are designated to serve as Technical Monitors or Project Officers shall meet qualifications as required by the appointing agency.
3. The USCG and EPA will seek innovative ways to authorize streamlined placement of new SAs, the expansion of existing SAs to add new projects, and other potential avenues to enhance and expand interagency collaboration.

#### **ARTICLE II. INTERAGENCY COMMUNICATIONS**

Both Parties recognize that the work initiated by either Party will, in most instances, involve one or more of the EPA-ORD laboratories, as well as the USCG's facilities in meeting the purpose of this MOA. The USCG and EPA will negotiate SAs as necessary to accomplish tasks in accordance with the terms of this MOA. To provide for consistent and effective communications between the USCG and EPA-ORD on an SA, the Director

of the affected EPA-ORD Laboratory will be designated as the EPA-ORD point of contact. It is the policy of EPA to delegate to appropriate levels in ORD Laboratories the authority and responsibility for negotiating and managing SAs.

The USCG and EPA will appoint representatives to review and discuss, at least annually, those activities that have been initiated under this MOA. These representatives shall serve as the points of contact between the USCG and EPA on matters relating to this MOA and are accountable for all activities. The USCG and EPA representatives are as follows:

For the U.S. Coast Guard:

Assistant Commandant for Marine Safety and Environmental Protection (G-M)  
U.S. Coast Guard  
2100 2nd Street, SW  
Washington, DC 20593-0001  
(Or designee)

For the U.S. Environmental Protection Agency's Office of Research and Development:

Assistant Administrator for Research and Development (8101R)  
U.S. Environmental Protection Agency  
Ariel Rios Building  
1200 Pennsylvania Avenue, NW  
Washington, DC 20460  
(Or designee)

### **ARTICLE III. PROVISIONS OF ASSISTANCE**

Nothing in this agreement alters the statutory authorities of EPA or the USCG. This MOA is intended to facilitate cooperative efforts for mutual provision of technology testing and evaluation, reporting of results, and technical assistance by both Parties in the conduct of programs affecting the quality of the environment. This MOA does not supersede or void existing understandings or agreements between EPA and the USCG.

Nothing in this MOA can be or should be construed to require the USCG to use the services of EPA-ORD, or to require EPA-ORD or the USCG to accept assignments from the other.

If work is conducted under SAs between the Parties that is subject to the National Environmental Policy Act (NEPA), each agency will assist the other in making NEPA determinations at its affected sites by providing all necessary documentation. Neither party to this agreement will be required to prepare an Environmental Assessment (EA) or Environmental Impact Statement (EIS) on any facility but its own unless otherwise agreed to in an SA.

## **ARTICLE IV. RESPONSIBILITIES**

### **A. The USCG agrees:**

1. To designate the Assistant Commandant for Marine Safety and Environmental Protection or his/her designee to be the point of contact (POC) to coordinate cooperation and development of a joint activities between the USCG and EPA's ETV program, to evaluate, test, or verify the performance of environmental technologies of mutual interest and, with the concurrence of the facilities concerned, assist in arranging project and site-specific supplemental agreements for related joint projects at selected USCG laboratories and facilities, at EPA facilities, or at other facilities, as appropriate.
2. To support selected ETV technology verification activities in support of joint USCG and EPA environmental technology evaluations by providing resources and/or technical expertise for performance evaluation, consultation in areas of mutual interest, and review of protocols and reports subject to program priorities and budget constraints.
3. To support the exchange of technical information--through databases, information systems, clearinghouse, conferences, and other means--on evaluation, testing, verification, and technology transfer opportunities and activities.

### **B. The EPA agrees:**

1. To designate the Assistant Administrator for Research and Development or his/her designee to be the point of contact (POC) to coordinate cooperation and development of joint activities between the USCG and EPA to evaluate, test, and verify the performance of environmental technologies of mutual interest and, with the concurrence of the facilities concerned, assist in arranging for supplemental agreements for related joint projects at selected EPA facilities and at USCG laboratories and facilities, or other facilities, as appropriate.
2. To support selected USCG technology evaluation, testing and verification activities by providing resources and/or technical expertise for performance review and evaluations, verification studies, or consultation in areas of mutual interest, subject to program priorities and budget constraints.
3. To support the exchange of technical information--through databases, information systems, clearinghouses, conferences, and other means--on technology evaluation, testing and verification activities.

### **C. The EPA and the USCG mutually agree:**

1. That this MOA will be referenced in any supplemental agreements, amendments, SAs, or letters of agreement prepared to document details of related cooperative efforts carried out by the two agencies.
2. To work jointly and cooperatively on the selection of stakeholders and technical experts to be included in appropriate workgroups which will be used to inform the participants of market forces and technical attributes of technologies to be tested and verified.
3. To work jointly and cooperatively in the selection of technology evaluation, testing and verification projects by providing available information pertinent to the selection of candidate technologies, facilities and other potential sites on which to perform technology verification activities.
4. To cooperate in conducting joint technology evaluation, testing, verification, and reporting activities involving mutually agreed upon technologies and projects of interest to both the USCG and EPA.
5. That determinations of technologies to be evaluated and verified under this agreement will be mutually agreed upon by the Parties.
6. That each Party will identify a person who will serve as a Project Officer on each technology (or technology group) evaluation. The Project Officers shall communicate regularly to ensure that the evaluations are conducted as expeditiously and efficiently as possible, and to resolve questions or issues in a timely manner.
7. That each agency will routinely provide to the other proposed outreach materials, press releases, or other public affairs information related to joint efforts.
8. That each agency will seek to ensure that there is sufficient funding and resources to carry out projects that are mutually agreed upon.

### **ARTICLE V. FUNDING**

This MOA does not transfer funds. Actual funding will be transferred only in accordance with and under specific support agreements that EPA-ORD and the USCG may subsequently write pursuant to this MOA. Support agreements written pursuant to this MOA will be based on and will cite appropriate statutory authority, and adhere to FAR 6.002 and FAR Subpart 17.5 and other applicable Federal laws and regulations. The USCG and/or EPA-ORD may provide funding for each collaborative project according to the specific purposes and availability of funds.

**ARTICLE VI. BILLING**

The Performing Agency will perform billing in accordance with the provisions of each SA.

**ARTICLE VII. ACCEPTANCE OF FUNDS**

Funds shall be considered obligated as specified by the terms of each SA, normally upon acceptance of the SA by the Performing Agency of the SA. All schedules or delivery dates will be expressed in the statement of work that accompanies each SA.

Performance by the Performing Agency or its recipient/contractor or cooperator shall continue until one or more of the following conditions are met: Completion of the Statement of Work and Task Closeout; expenditures/commitments equal the amount authorized for the task are met; or the task is terminated by either Party in accordance with Article XVII of this agreement.

**ARTICLE VIII. APPLICABLE LAWS AND REGULATIONS**

The USCG or EPA-ORD shall furnish all assistance under this MOA and the SAs negotiated pursuant to this MOA in accordance with applicable laws and regulations. Unless otherwise required by law or set forth in this MOA, all work undertaken by EPA-ORD or the USCG shall be performed in accordance with the USCG's or EPA-ORD or their recipient/contractor's procurement, claims, and reimbursable work policies and procedures.

Nothing in this MOA relieves any applicant, grantee, cooperator, consultant, contractor, subcontractor, or other party from any obligations imposed upon them by law, regulations, and other applicable requirements.

**ARTICLE IX. RECORDS AND REPORTS**

To the extent practicable, SAs will contain provisions for implementing the following:

The Performing Agency shall establish and maintain records and receipts of the expenditure of all funds provided by the Requesting Agency. Records shall be maintained in sufficient detail to permit identification of the nature of the expenditures made by the Performing Agency and shall be made available for inspection by officials of the Requesting Agency upon request.

The Performing Agency will provide technical status and cost reports on projects pursued under this MOA and the SAs negotiated under this MOA. Upon request, the Performing Agency will also provide reports and/or briefings, consistent with its internal reporting practices for similar projects. To the maximum practicable extent these reports will

include management information to help monitor scheduled activities. These reports will provide data to support planning and budget decisions, and the evaluation of expenditures.

Upon request, copies of Performing Agency documents supporting contract management decisions and activities affecting the Requesting Agency's projects will be made available to the Requesting Agency for review and retention. However, the Performing Agency will retain all originals in accordance with Federal records management practices and the Requesting Agency shall not copy or publish such documents, except as authorized by the Performing Agency or court of competent jurisdiction. When the Requesting Agency receives requests for these documents, it will, in accordance with 40 C.F.R. 2.111(d)(EPA) or 49 C.F.R. 7.16(a)(USCG), consult with the Performing Agency before releasing the documents or promptly refer the request to the Performing Agency.

#### **ARTICLE X. CONTRACT CLAIMS AND APPEALS**

All claims arising under or relating to SAs executed hereunder shall be resolved in accordance with Federal law and the terms of the individual SA or supporting contractor cooperative agreement. The Parties shall consult with each other during resolution of such claims and appeals, recognizing that each organization will pursue its own best interests.

#### **ARTICLE XI. PATENTS**

The USCG and EPA patent and intellectual property policies shall apply to any work performed, and appropriate patent and intellectual property provisions shall be included in any agreements entered into in order to implement an SA accepted under this MOA. Rights to inventions made by U.S. Government employees shall be determined by the employee's agency. Rights in inventions and other intellectual property of technology vendors and contractors, subcontractors and cooperators shall be governed by the provisions of their respective agreement with EPA or the USCG.

To further the mandates of the Federal Technology Transfer Act, the Parties agree to the extent consistent with law and with the nature of the work under this MOA to:

1. Include technology transfer considerations in preliminary planning or work statements.
2. Identify internal personnel or offices responsible for technology transfer.
3. Work cooperatively to enhance technology to transfer opportunities that may arise under this MOA.

## **ARTICLE XII. PROPERTY/EQUIPMENT**

If equipment is acquired by the Performing Agency as part of the project, the Performing Agency will account for and maintain such equipment during the term of the project in the same manner as its own property. When the project terminates, disposition of the equipment will be as previously agreed to or as instructed by the Requesting Agency. Cost of disposition shall be borne by the Requesting Agency.

## **ARTICLE XIII. DISPUTE RESOLUTION**

In the event of a dispute among the USCG, EPA or their contractor(s) or cooperators in performance of this work, the agencies will resolve the dispute in compliance with applicable law and regulation. In the absence of applicable law and regulation, the Parties will cooperate to find a means of settlement that is equitable. If a dispute cannot be resolved, the Parties may consider a third party forum to settle the dispute.

## **ARTICLE XIV. PUBLIC INFORMATION**

Subject to the Freedom of Information Act (5 U.S.C. § 552) and to the Privacy Act (5 U.S.C. § 552a), decisions on disclosure of information to the public regarding work undertaken pursuant to this MOA shall be made by the agency that created the document, consistent with applicable regulations.

Prior to issuing public announcements pertaining to services or activities related to this MOA, the Parties agree to secure approval from each other. Such approval shall not be unreasonably withheld or denied beyond thirty (30) days. The Performing Agency may provide, upon request, information to support contacts with Congress and the Executive Branch. The Performing Agency may make public announcements and respond to all inquiries relating to administration matters.

## **ARTICLE XV. CONFIDENTIALITY, CONSISTENCY & SEGREGABILITY**

To the extent permitted by the law governing each Party, including the Freedom of Information Act and the Privacy Act, the Parties agree not to disclose or disseminate to others exchanged information unless expressly authorized to do so

Nothing in this MOA is intended to conflict with current law or regulation or the directives of the USCG, EPA, or other Party. If a term of this MOA is inconsistent with Federal law or such authority of a Federal Party (USCG or EPA), then that term shall be invalid, but the remaining terms and conditions of this MOA shall remain in full force and effect.

**ARTICLE XVI. ENVIRONMENTAL AND SAFETY RESPONSIBILITY**

Both Parties agree that while the Performing Agency and its contractors and subcontractors will be expected to adhere to the requirements of applicable environmental or safety laws and regulations, none of the activities under this agreement create an obligation by the Performing Agency or its contractors and subcontractors for remedial action or payments therefore or any other continuing responsibility under any such law or regulation.

**ARTICLE XVII. EFFECTIVE DATE AMENDMENT AND TERMINATION**

This MOA is effective upon the date of the last signature by the Parties and shall remain effective for a five-year period from the effective date unless terminated in accordance with the terms set forth herein. This MOA may be modified by mutual consent of both Parties.

Either Party may terminate this MOA by providing 90 calendar days written notice. If termination of the MOA affects active SAs or otherwise has a cost impact, EPA and the USCG shall consult with each other concerning all claims for termination costs, including costs of closing out or transferring any ongoing obligations. Ongoing work under any active SA will be completed in accordance with its terms and applicable law and regulation.

Upon request by either Party, but at least annually, both parties shall review this MOA, to assure that it continues to reflect the appropriate understandings and procedures to provide for current needs and capabilities.

**ACCEPTANCE:**

For the U.S. Coast Guard

For the U.S. Environmental Protection Agency

By: Paul J. Pluta

By: Henry L. Longest

Date: Signed 6/12/01

Date: Signed 6/12/01

Paul J. Pluta  
Assistant Commandant for Marine Safety  
and Environmental Protection  
U.S. Coast Guard

Henry L. Longest II  
Acting Assistant Administrator for  
Research and Development  
U.S. Environmental Protection Agency

**Memorandum of Understanding Between  
The United States Coast Guard, Office of Marine Safety, Security and Environmental Protection  
and  
The United States Environmental Protection Agency, Office of Water  
for EIS activities under NEPA for NANPCA rulemaking**

**August 2003**

**A. Statement of Purpose**

The purpose of this Memorandum of Understanding (MOU) is to establish procedures and policies to be employed by the United States Coast Guard (USCG) and the United States Environmental Protection Agency (EPA) for USCG to complete environmental impact analysis (EIS) under the National Environmental Policy Act (NEPA) for certain rulemaking activity pursuant to Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 (NANPCA), as amended by the National Invasive Species Act of 1996 (NISA). Specifically, this MOU is consistent with the Council on Environmental Quality (CEQ) regulations at 40 CFR 1501.6, 1501.8, and the January 30, 2002, CEQ Memorandum For The Heads Of Federal Agencies (Subject: Cooperating Agencies In Implementing The Procedural Requirements Of The National Environmental Policy Act). This MOU may serve as a potential model for future ballast water management activities between the two agencies as regulatory standards are developed and implemented over time.

It is the intent of the signatories to this MOU that this be a cooperative, non-adversarial endeavor, and all parties enter into this agreement with the intent to take reasonable steps to facilitate its successful execution. The parties note their ongoing productive and cooperative relationship in related areas, such as their participation on the ANS Task Force, interagency work group activities in support of developing the United States (US) position for an international ballast water agreement and various research partnerships. These activities will continue to provide valuable input to the standard development process and be governed under separate arrangements. Therefore nothing herein should be construed to alter any existing agreement for matters not specifically addressed in this MOU. Specifically, the provisions of this MOU will cover USCG and EPA roles with regard to the environmental analysis (i.e. environmental impact statement) for the USCG rule making activities pursuant to NANPCA, and amended by NISA. In NISA, Congress directs the USCG to issue regulations and guidelines to prevent the introduction and spread of non-indigenous species in US waters.

**B. Terms and Conditions**

This MOU will take effect immediately upon being executed and will expire at the end of 5 years at which time it may be renewed, amended, or left to expire. Either party may terminate the MOU by giving the other party 30 days written notice. Both parties must agree to any changes, modifications, and amendments in writing.

EPA participates in this MOU as a cooperating agency under authority set forth in Section 1501.6 of CEQ's NEPA implementing regulations. USCG participation in this MOU is authorized by 14 U.S.C. §141, USCG cooperation with other agencies, states, territories, and political subdivisions. This instrument in no way restricts either Party from participating in similar activities with other public or private agencies, governments, organizations, or individuals.

## **C. Limitations**

All commitments made in this MOU are subject to the availability of appropriated funds and each agency's budget priorities. Nothing in this MOU, in and of itself, obligates USCG or EPA to expend appropriations or to enter into any contract, assistance agreement, interagency agreement, or other financial obligations.

This MOU is neither a fiscal nor a funds obligation document. Any endeavor involving reimbursement or contribution of funds between the parties to this MOU will be handled in accordance with applicable laws, regulations, and procedures, including those for government procurement and printing, and will be subject to separate subsidiary agreements that will be effected in writing by representatives of both parties.

This MOU does not create any right or benefit, substantive or procedural, enforceable by law or equity against USCG or EPA, their officers or employees, or any other person. This MOU does not direct or apply to any person outside USCG and EPA.

Any press releases or other public documents that reference this MOU, or the EIS, shall have prior approval of both Parties, with the exception of EPA comments to be made public pursuant to the Clean Air Act Section 309. Both parties agree that any privileged intra-agency records created and/or inter-agency records shared as a result of this agreement shall not be released to the public, such as pursuant to a Freedom of Information Act request, without prior consultation and approval from representatives of both agencies.

This agreement is intended only to improve the internal management of the Executive Branch and is not intended to, nor does it, create any right to administrative or judicial review, or any right, whether substantive or procedural, enforceable by any party against the United States, its agencies or instrumentalities, its officers or employees, or any other Person.

Each party will communicate regularly with the other including, at minimum, immediate information of schedule changes that would affect its ability to provide timely input to the document.

## **D. Stipulations**

The Parties Will: Comply with all necessary provisions of NEPA. The USCG will complete an EIS analyzing the impacts associated with rulemaking pursuant to NANPCA and NISA. Pursuant to that law, the USCG will undertake to establish certain standards for non-indigenous species. The EPA will perform its duties as a cooperating agency in addition to its traditional duties as a reviewer of the EIS under Section 309 of the Clean Air Act. Those review duties are independent of this agreement. Moreover, wherever possible, the USCG will adopt EPA input and incorporate same into its own conclusions prior to finalizing any section to be drafted by EPA. USCG will seek EPA's agreement on any changes USCG seeks to make to EIS sections drafted by EPA.

The Parties Will: Complete tasks listed in Attachment A according to the outlined schedule. Each agency will be responsible for the task assigned and the USCG will have overall responsibility for completion of all tasks. Once complete, the USCG will confirm, in writing, completion of these tasks. Attachment A may be updated by mutual agreement of the USCG and EPA designated representatives. The agencies will identify their designated representatives by letter.

The USCG will serve as lead agency for the development of the EIS. The EPA will serve as a cooperating agency by virtue of its considerable expertise in the subject matter area and related jurisdictional authority. EPA will be given ample opportunity to review EIS drafts before they are made public. EPA will also draft a response to public comments which speak to those portions of the EIS the EPA drafted.

The document will list the portions identified in Attachment A along with the agency (EPA or USCG) responsible for their completion.

**DISPUTES:** The following procedures shall be utilized to elevate any conflict or disagreement between the agencies. In any elevation, the agencies will jointly prepare an elevation document that will contain a joint statement of facts and succinctly state each agency's position and recommendations for resolution. If the agencies are aware of a dispute, they will defer taking final action, where consistent with applicable legal deadlines, to allow the issue to be resolved through the elevation process. The following procedures shall be utilized to elevate any conflict or disagreement between the agencies regarding their responsibilities under this MOU.

Level 1: The Level 1 review team consists of staff personnel from USCG and EPA. Any contentious issues will be discussed with an attempt to resolve them without further elevation. If disputes cannot be resolved among the Level 1 team members, the issue will be raised with the Level 2 review team as soon as possible.

Level 2: The Level 2 review team consists of the signatories to this agreement or their successors. The Level 2 team will make their best efforts to resolve any issues elevated to them. Where resolution is not possible at this level, the Level 2 team will elevate the issue to Headquarters Review no later than 14 days after notification by the Level 2 team, or sooner as agreed upon or mandatory deadlines require.

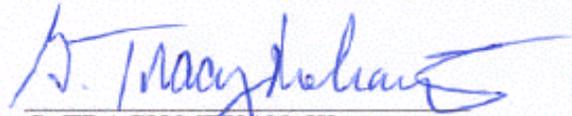
Headquarters Review: This review consists of the Administrator of EPA, and the Commandant, USCG, or their representatives, who will attempt to resolve disputes elevated by the signatories. Headquarters Review officials will attempt to issue a decision resolving the dispute within 21 days after elevation. Decisions will be binding upon the agencies' field staffs. At this resolution level, the decision rests with the agency exercising the statutory or regulatory authority in question.

**E. The Parties Hereto have executed this agreement as of the last date shown below.**



T. H. GILMOUR, RADM, USCG  
Assistant Commandant for Marine Safety,  
Security and Environmental Protection

Date August 21, 2003



G. TRACY MEHAN, III  
ASSISTANT ADMINISTRATOR  
Office of Water, U. S. EPA

Date August 21, 2003

# Attachment A

## Proposed EIS for Ballast Water Discharge Standard Regulations

Activity/Action	CEQ Ref.	USCG Action (Lead Agency)	EPA Action (Cooperating Agency)
Public Meetings <ul style="list-style-type: none"> <li>• Identify topics</li> <li>• 2-4 meetings (DC, San Fran, Ann Arbor, Houston)               <ul style="list-style-type: none"> <li>○ FR notice</li> </ul> </li> <li>• Transcripts</li> </ul>		Lead - - - USCG to publish - USCG contractor	- Assist - provide \$25k - participate
EPA and USCG MOU on EIS development <ul style="list-style-type: none"> <li>• Includes suggested research</li> <li>•</li> </ul>		Joint lead	Joint lead
EIS NOI <ul style="list-style-type: none"> <li>• To EPA for review</li> <li>• To list public meeting dates</li> </ul>		USCG to draft	EPA to Review
Cover Sheet (1 page in length) <ul style="list-style-type: none"> <li>• List agencies</li> <li>• Title of proposed action and location</li> <li>• Contact for further information</li> <li>• Document Type (EIS)</li> <li>• 1 paragraph abstract</li> <li>• Comment deadline (draft EIS)</li> </ul>	1502.11	USCG to draft	EPA to review
Summary - ≤ 15 pages and includes <ul style="list-style-type: none"> <li>• Major conclusions               <ul style="list-style-type: none"> <li>○ Standard</li> </ul> </li> <li>• Areas of controversy               <ul style="list-style-type: none"> <li>○ Cost</li> <li>○ Effectiveness</li> <li>○ Technology</li> </ul> </li> <li>• Issues raised by agencies/public</li> <li>• Issues to be resolved</li> <li>• Choice among alternatives</li> </ul>	1502.11	USCG to Draft	EPA to review
Purpose and Need	1502.13	USCG to draft	EPA to review
Options paper identifying potential discharge standard alternatives		USCG to draft	EPA to review
Alternatives Including the Proposed Action <ul style="list-style-type: none"> <li>• Explore and evaluate all alternatives               <ul style="list-style-type: none"> <li>○ Discuss why eliminated or kept</li> <li>○ Include alternatives not within jurisdiction of USCG or EPA</li> </ul> </li> <li>• Environmental impacts of proposal</li> <li>• Environmental impacts of the alternative standards in comparative form</li> <li>• Define issues and explain the basis for the preferred alternative</li> <li>• Include evaluation of no action</li> <li>• Identify preferred alternative</li> <li>• Include appropriate mitigation measures not already included in proposed action or alternatives.</li> <li>• Identify scientific basis for standard</li> </ul>	1502.14 1502.14a 1502.14b 1502.14c .14(d) .14(e) .14(f)	USCG to review USCG to review USCG to review USCG to review USCG to review USCG to review USCG to draft	EPA contractor to draft based upon USCG option paper EPA contractor to draft EPA contractor to draft EPA to review EPA contractor to draft EPA to review





# UNITED STATES COAST GUARD



## REPORT TO CONGRESS ON THE VOLUNTARY NATIONAL GUIDELINES FOR BALLAST WATER MANAGEMENT

NOVEMBER 2001



THE SECRETARY OF TRANSPORTATION

WASHINGTON, D.C. 20590

June 3, 2002

The Honorable Richard B. Cheney  
President of the Senate  
Washington, DC 20510

Dear Mr. President:

Section 1101(d) of the National Invasive Species Act (NISA)(Pub. L. 104-332) directs the Secretary of Transportation (Secretary), after consultation with interested and affected parties to prepare and submit to the Congress, not sooner than 24 months, or later than 30 months from the date of issuance of voluntary national guidelines to prevent the introduction and spread of non-indigenous species in waters of the United States by ballast water operations and other operations of vessels equipped with ballast water tanks, a report to assess the compliance with those guidelines and to establish the rate of compliance based on that assessment. The U.S. Coast Guard implemented these guidelines through Title 33 Code of Federal Regulations (CFR) Part 151 Subpart D Ballast Water Management for Control of Non-indigenous Species in Waters of the United States on July 1, 1999.

Section 1102(f)(2) of NISA directs the Secretary of Transportation, in consultation and cooperation with the Aquatic Nuisance Species Task Force and the Smithsonian Institution (acting through the Smithsonian Environmental Research Center), to prepare and submit to the Task Force and Congress, on a biennial basis, a report that synthesizes and analyzes data relating to ballast water delivery management and invasions of aquatic nuisance species resulting from ballast water. The first such report was submitted to Congress on March 1, 1999.

Due to the overlapping nature and content of the reports required by these two sections of NISA, as well as their coinciding due dates, the attached report which assesses the adequacy and effectiveness of voluntary ballast water management guidelines, responds simultaneously to both sections.

In the report, we discuss a variety of future actions that we at the Department, through the Coast Guard, plan to take, many of which include promulgating regulations. The four key projects involve very complex issues, particularly when it comes to evaluating the environmental and economic impacts of any promulgated regulations. In light of this fact, we have already taken steps to make EPA a cooperating agency, under the Council on Environmental Quality's guidelines for implementing the National Environmental Policy Act (NEPA). By doing so, we will be able to draw on EPA's expertise, allowing us to shorten the timelines the Coast Guard has already established for these rules.

I am including timeline estimates for the four key projects that relate to the "Future Actions" section of this report. Please note that these dates reflect when the Coast Guard

anticipates having regulatory documents ready for DOT and Inter-Departmental review, and not the actual publication date. Barring any additional or unforeseen regulatory activities particularly with regard to homeland security, the estimates are as follows:

Incorporating penalties for a vessel's failure to submit ballast water management reports: NPRM in winter of 2002; Final Rule in Fall of 2003.

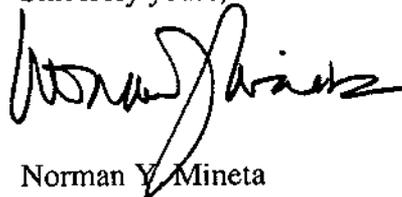
Transitioning from a voluntary national ballast water management program to a mandatory program: NPRM in fall of 2003; Final Rule in Summer of 2004.

Establishing a standard to serve as the benchmark for all ballast water management options: NPRM in winter of 2003; Final Rule in Fall of 2004.

Developing a protocol for Coast Guard approval of installation of experimental technologies on board vessels: Interim Rule in winter of 2002.

An identical letter has been sent to the Speaker of the House of Representatives.

Sincerely yours,

A handwritten signature in black ink, appearing to read "Norman Y. Mineta". The signature is fluid and cursive, with a large loop at the end.

Norman Y. Mineta

Attachment



THE SECRETARY OF TRANSPORTATION

WASHINGTON, D.C. 20590

June 3, 2002

The Honorable J. Dennis Hastert  
Speaker of the House of  
Representatives  
Washington, DC 20515

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Norman Y. Mineta

Attachment

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# Executive Summary

## **Introduction**

Spurred by the negative environmental and social impacts of the zebra mussel invasion of the Great Lakes, and evidence of an increasing number of biological invasions of other aquatic ecosystems by nonindigenous species, Congress enacted the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 (NANPCA)(Pub. L. 101-646) and the National Invasive Species Act of 1996 (NISA)(Pub. L. 104-332), to prevent and control infestations of the U.S. coastal and inland waters by nonindigenous aquatic nuisance species (ANS).

As directed by these two laws, the Secretary of Transportation (Secretary), acting through the U.S. Coast Guard, established mandatory ballast water management (BWM) regulations for the Great Lakes ecosystem, and voluntary guidelines for the remainder of U.S. waters.

Section 1101 (d) of NISA directed the Secretary to assess and report the effectiveness of the voluntary guidelines to Congress and if necessary, take appropriate regulatory actions to ensure the legislative intent is realized. This report is provided to meet this requirement.

## **Sources of Data and Information Presented in this Report**

The primary data used in this report are from the National Ballast Survey (NABS), which was developed and implemented by the Coast Guard and the National Ballast Information Clearinghouse (NBIC). The NBIC was collaboratively established by the Coast Guard and Smithsonian Environmental Research Center to collect and analyze information and data regarding compliance with ballast water reporting requirements, and patterns of ballast water delivery and management throughout the country.

Section 1101(e)(3) of NISA directed the federal Aquatic Nuisance Task Force to develop and submit to the Secretary criteria for determining the adequacy and effectiveness of the program of voluntary guidelines. The Task Force concluded that for the voluntary guidelines to be considered operationally “adequate” it would need to achieve a level of compliance on par with a program subject to full enforcement and suggested using the mandatory Great Lakes program, as a benchmark.

To fulfill Congress’s direction to consult with interested and affected parties prior to preparing and submitting this report, the Coast Guard held a series of regional public meetings to provide all parties the opportunity to comment and make recommendations on the Coast Guard’s BWM program. Through notice in the Federal Register, the Coast Guard also requested written comments.

## **Assessment of the Effectiveness of the National Voluntary Ballast Water Management Guidelines**

Analysis of the information received by the NBIC under the voluntary guidelines indicates that:

1. Only 30.4 % of regulated ships submitted reports during the first 24 months that reporting requirements were in effect. Over the two-year period, the monthly

compliance rate increased gradually from about 20% initially to a final rate of about 40%.

2. About one half (51.2%) of the reporting ships that discharged ballast water performed some degree of ballast water exchange. Over the two-year period, there was little change in the proportion of the reporting vessels that conducted an exchange of ballast water. The reasons for not performing ballast water exchange were varied and included constraints posed by the vessel's itinerary, as well as ship and crew safety concerns.

Having (1) reviewed the data collected and the analysis conducted by the NBIC, and (2) assessed these under the Task Force's criteria for determining the adequacy and effectiveness of such a program, it is the Secretary's determination that the consistently low rate of vessel reporting makes it impossible to accurately assess compliance with the voluntary BWM guidelines.

Although the limited data regarding shipboard BWM practices makes it impossible to accurately assess the guidelines' effectiveness in reducing the introduction and spread of ANS by vessels, the comments received from a range of interested and affected parties since the program's implementation clearly indicate there is broad support for a mandatory national BWM program based on the practices contained in the voluntary guidelines.

Therefore, due to the low reporting, the resulting inability to make valid program assessments, and broad support for a mandatory national program, the Secretary, as directed by NISA, will issue regulations making the requirements of the voluntary program mandatory and provide the necessary enforcement.

### **Future Actions**

Balancing the ecological, social and economic concerns of the affected parties, the Coast Guard will implement a robust national BWM program that maximizes the use of existing BWM techniques by all vessels, while fostering the development of new ballast water treatment (BWT) technologies. To accomplish this, the following initial steps will be taken by the Coast Guard.

1. Develop regulations to require **all** vessels equipped with ballast tanks that enter U.S. waters after operating beyond the Exclusive Economic Zone (EEZ), **or** are engaged solely in voyages between U.S. ports, to perform appropriate record keeping and reporting.
2. Issue regulations requiring vessels equipped with ballast tanks that enter the waters of the United States after operating beyond the EEZ to conduct active BWM.
3. Enforce the sanctions established in section 1101(g) of NISA for failing to comply with the program's requirements. The "safety exemption" provided for in section 1101(k) of NISA will remain a central tenant in implementation and enforcement of the BWM program, but its use will be monitored and verified to thwart abuse.
4. Continue its efforts to establish a quantitative BWT performance standard; protocols for testing, verifying and reporting on BWT technologies; and a program to facilitate experimental shipboard installation and operation of promising BWT technologies.

## Section I

### **LEGISLATIVE HISTORY AND AUTHORITY**

## Introduction

Spurred by the negative environmental and social impacts of the zebra mussel invasion of the Great Lakes, and evidence of an increasing number of biological invasions of other aquatic ecosystems by nonindigenous species, Congress enacted the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 (NANPCA)(Pub. L. 101-646). To prevent and control infestations of the United States coastal and inland waters by the zebra mussel and other nonindigenous aquatic nuisance species (ANS), NANPCA directed a suite of federal actions, including the development of a mandatory ballast water management (BWM) program for the Great Lakes ecosystem.

Responding to mounting evidence of continuing biological invasions in aquatic ecosystems other than the Great Lakes, Congress passed the National Invasive Species Act of 1996 (NISA)(Pub. L. 104-332), reauthorizing and amending NANPCA, and extending the program of BWM to prevent introductions of ANS to the remainder of U.S. waters.

Section 1101 of NISA directed the Secretary of Transportation (Secretary) to:

1. Establish a regime of voluntary national BWM guidelines to prevent, to the maximum extent practicable, the introduction and spread of nonindigenous species in waters of the U.S. by vessels equipped with ballast water tanks;
2. Assess and report the effectiveness of the guidelines to Congress; and
3. Make the provisions of the program mandatory if voluntary compliance was found to be insufficient to meet its stated objectives.

This report is provided to meet the requirements of section 1101 (d) of NISA.

### **REGULATORY DEVELOPMENT ACTIONS**

The Coast Guard established NANPCA's mandatory BWM program for the Great Lakes on May 10, 1993. These rules, first published in Federal Register April 8, 1993 (58 FR 18334), were later expanded to include the Hudson River north of the George Washington Bridge (59 FR 67632, Dec. 30 1994) and are contained in 33 CFR 151 subpart C.

To fulfill NISA's mandate to increase protection of aquatic related resources and infrastructure through a voluntary BWM regime, the Coast Guard published an Interim Rule in the Federal Register (64 FR 26682, May 17, 1999). These regulations, in effect as of July 1, 1999, and applicable to U.S. waters outside of the Great Lakes ecosystem:

1. Request operators of vessels entering these waters after having operated beyond the Exclusive Economic Zone (EEZ) of the United States to follow a suite of specified BWM practices;
2. Require operators of these vessels to submit a report of their BWM activities to the National Ballast Information Clearinghouse; and
3. Promote good husbandry and BWM practices for operators of all vessels in waters of the United States.

The details of these BWM guidelines, which became a Final Rule on November 21, 2001, are contained in 33 CFR 151 subpart D and included as Appendix A to this report.

## **BALLAST WATER TREATMENT**

Along with establishing and implementing the mandatory and voluntary BWM regimes called for by Congress, the Coast Guard, working with a variety of other organizations and individuals, has taken a lead role in facilitating the development of ballast water treatment (BWT) technologies. Central to this are ongoing efforts to establish:

1. A quantitative BWT performance standard;
2. In cooperation with the U.S. Environmental Protection Agency's Environmental Technology Verification (ETV) program, protocols for testing, verifying and reporting on BWT technologies; and
3. A program that will provide incentive for the experimental shipboard installation and operation of promising BWT technologies.

In conjunction with these initiatives, the Coast Guard:

1. Published a notice and request for comments (66 FR 21807, May 1, 2001) on four possible approaches to setting standards for BWT, and posed questions related to setting, implementing and enforcing such standards;

2. Prepared an advance notice of proposed rulemaking requesting comments on options for a BWT goal and interim standard;
3. Signed a Memorandum of Agreement with the ETV on June 12, 2001, establishing a formal engineering test program to accelerate the development and commercialization of ballast water treatment technologies; and
4. Published a notice and request for comments (66 FR 28213, May 22, 2001) on how a program of experimental BWT installation and testing might be structured so as to encourage participation by ship owners and operators.

**REPORT  
REQUIREMENTS AND  
FOLLOW-ON ACTIONS**

Sections 1101 (d) and (e) of NISA provide specific guidance for both the preparation of this report, and for follow-on actions based on the report's possible findings. Using criteria developed by the Aquatic Nuisance Species Task Force (Task Force) and after consulting with interested and affected parties, the Secretary is to provide Congress with an assessment of the compliance by vessels with the guidelines and regulations issued under NISA.

(Note: The Task Force is an intergovernmental organization of seven federal members and 11 ex-officio members, co-chaired by the U.S. Fish and Wildlife Service and National Oceanic and Atmospheric Administration, which was established by NANPCA to coordinate governmental efforts related to nonindigenous aquatic species in the United States with those of the private sector and other North American interests.)

Along with establishing the rate of compliance, the review must include an evaluation of the effectiveness of the voluntary guidelines and regulations in reducing the introduction and spread of aquatic nuisance species by vessels. Should the review indicate that the legislative intent is not being realized, the Secretary is directed to utilize the best scientific information available as a basis to revise the guidelines and regulations.

Congress anticipated that the Secretary might find voluntary compliance with the guidelines inadequate, or the rate of reporting inadequate for a valid assessment of such compliance to be made. In either of those events, NISA requires the Secretary to make the practices in the voluntary guidelines mandatory and to provide for their enforcement. NISA provides the associated penalty provisions and stipulates that the regulations cannot be promulgated sooner than 180 days after the issuance of the report to Congress.

**INTERNATIONAL  
COORDINATION**

NISA calls for the U.S. government to engage in foreign negotiations to address ANS. These discussions are taking place at the International Maritime Organization (IMO) Marine Environment Protection Committee where the Coast Guard led U.S. delegation continues to exhibit a leadership role in drafting an environmentally and economically sound treaty. The major obstacle to concluding an international agreement remains the absence of a BWT standard, and the technologies to meet that standard.

In the interim, the IMO has adopted Resolution A.868(20) “Guidelines for the Control and Management of Ships' Ballast Water to Minimize the Transfer of Harmful Aquatic Organisms and Pathogens” which requests all vessels to implement the Guidelines’ practices. The U.S. BWM actions are fully consistent with this IMO resolution.

## Section II

## Sources of Data and Information Presented in this Report

### **NATIONAL BALLAST INFORMATION CLEARINGHOUSE**

Section 1102 (f) of NISA directs the Secretary of Transportation and the Smithsonian Environmental Research Center (SERC) to collaboratively create and operate the National Ballast Information Clearinghouse (NBIC) for the collection and analysis of information and data regarding compliance with ballast water reporting requirements, BWM practices, and ecological surveys of aquatic nuisance species in U. S. waters. The NBIC is physically located at the SERC, in Edgewater, MD, and financially supported by the Coast Guard, via a cooperative agreement with the Smithsonian Institution.

### **NATIONAL BALLAST SURVEY**

To enable analyses and assessments of BWM and delivery patterns by commercial vessels, as well as meet NISA's report requirements, the Coast Guard and the NBIC developed and implemented the National Ballast Survey (NABS). On March 1, 1999 the Secretary submitted to Congress the "National Ballast Water Information Clearinghouse: Function, Design and Implementation – Progress Report I", the body of which is a complete description of the approach, rationale, and methodologies behind this nationwide survey.

The NABS was designed explicitly to create a national ballast water database to be used to analyze:

1. Rates of compliance with BWM reporting and the voluntary management guidelines;
2. Patterns and year-to-year changes in ballast water delivery and management practices by vessel classes, geographic regions, and seasons; and
3. The accuracy of the submitted data through the use of multiple, independent data sources.

The NABS permits a comprehensive analysis of ballast water delivery patterns throughout the country. This report's policy recommendations are based to a great extent on the various NBIC analyses and interpretations of BWM patterns.

Using the NABS data for the two year period July 1, 1999 – June 30, 2001, the NBIC estimated rates of ballast water reporting and ballast water exchange (BWE). BWE was analyzed both in terms of the number of vessels performing a mid-ocean exchange of

ballast water, and the amount of discharged ballast water that has been subjected to the mid-ocean exchange process.

**CRITERIA FOR EFFECTIVENESS**

Section 1101(e)(3) of NISA directed the Task Force to develop and submit to the Secretary the criteria for determining the adequacy and effectiveness of the program of voluntary guidelines. A Task Force committee that included a cross section of government, industry, and non-government interests completed this work and its final report was forwarded to the Coast Guard in July 2001.

While recognizing the challenges posed when trying to implement a management practice (mid-ocean BWE), which in itself is less than 100% effective in achieving its goal, the report recommended that the highest possible rate of compliance should be sought since anything less than 100% compliance would facilitate the continued importation and release of nonindigenous species.

The Task Force concluded that for the voluntary regime to be considered operationally “adequate” it would need to achieve a level of compliance on par with a program subject to full enforcement, and suggested using as a benchmark the mandatory Great Lakes program, which has a near 100% level of compliance as verified by the Coast Guard's shipboard inspections.

**PUBLIC INPUT**

During the development and implementation of the voluntary guidelines, the Coast Guard made a practice of consulting with a variety of government, industry, non-government and public interests in an effort to obtain their suggestions on how to best structure and execute a national BWM program.

NISA directed the Secretary to consult with interested and affected parties prior to submitting this report on the national BWM program to Congress. In fulfilling this obligation, Coast Guard held a series of regional public meetings to provide all parties the opportunity to comment on all aspects of the Coast Guard's BWM program and make recommendations for changes. These meetings took place in Oakland, CA, Houston, TX, Ann Arbor, MI, and Washington, DC between August 28 and September 18, 2001.

All of the meetings followed a consistent format of (1) opening remarks and establishment of meeting procedures; (2) an overview of the Coast Guard's current BWM program and questions from the audience about the program; and (3) public comment for the record followed by closing remarks.

Attendance, while less than anticipated with only 65 total

participants, was diverse. The shipping industry was best-represented at all four meetings, accounting for approximately 60% of participants, with Coast Guard personnel, other federal and state agencies, and environmental groups making up the remainder.

The notice in the Federal Register announcing the public meetings also allowed written comments to be submitted to the Coast Guard up to a closing date of September 30, 2001, and provided a list of questions the agency was particularly interested in. Sixteen sets of comments were received at the docket (USCG 2001-10062), with 80% from representatives of maritime transportation related industries.

### Section III

## Assessment of the Effectiveness of the National Voluntary Ballast Water Management Guidelines

#### **EFFECTIVENESS OF BALLAST WATER EXCHANGE**

While NABS provides a detailed quantitative assessment of compliance with the voluntary practice of mid-ocean exchange, it is important to recognize this is only one measure of the guidelines' effectiveness. NABS is designed to measure the rate of implementation for this management strategy, but it does not measure the actual effect on reducing the rate of invasions.

It seems intuitive that performing BWE will reduce the supply of organisms that arrive to U.S. ports in ballast water, which will result in fewer invasions overall. There is a good deal of support for this logic.

Studies have shown that BWE is not 100% effective, as not all organisms are removed by exchange. Therefore the ultimate effectiveness of this management strategy depends upon both (a) the degree of implementation and (b) the relationship between the supply of organisms and invasion rates. While the former lends itself to relatively straightforward quantitative measurement, the latter remains a critical topic of ongoing research by scientists studying biological invasions.

However, the Task Force recommended that adequacy of the voluntary program be assessed with respect to compliance with the mandatory Great Lakes program, which also relies on BWE. Therefore, for purposes of assessing adequacy, degree of implementation is more relevant than the biological effectiveness of BWE itself.

#### **PUBLIC VIEWS**

There were three recurring themes at each of the public meetings that can reasonably be characterized as consensus views of the participants.

1. The perceived limitations of the voluntary guidelines, particularly the absence of penalties, have led to a number of individual state ballast water laws and regulations. A strong and enforceable national BWM program that adequately addresses state, regional, and national environmental and economic interests is preferable to a patchwork of state programs.
2. The voluntary program is ineffective at realizing high rates of complete BWE by vessels. The Coast Guard should institute a national program of mandatory BWM practices as soon as

possible, basing this program initially on the practices in the voluntary regime.

3. The Coast Guard should institute this mandatory program while simultaneously continuing its efforts to develop a BWT standard that could then drive the development of alternative treatment technologies.

The written comments submitted in response to the Federal Register notice generally reiterated the consensus views at the public meetings. The following additional non-consensus recommendations and concerns were identified for Coast Guard consideration

1. While it will be necessary to take into account a variety of vessel characteristics (i.e. age, design, operating conditions, etc.), BWM should be required of all vessels, including those engaged solely in voyages between U.S. ports.
2. In establishing any BWM program, the safety of the vessel, its crew, or its passengers, as well as the unimpeded operation of the vessel, should remain overarching considerations. Appropriate provisions should be included to prevent jeopardizing safety. Enforcement procedures must be in place to validate the veracity of a vessel's claims that it was unable to fully comply with the BWM requirements because of safety concerns.
3. Complying with the current operating definition of mid-ocean BWE requires a ship to exchange its ballast water of coastal origins with mid-ocean water (water from an area at least 200 miles from the nearest shore and with a water depth of at least 2000 meters). Experience shows that this definition severely reduces the number of ships that are able to conduct an exchange without significantly altering their route and adding substantial costs and delays to their voyages. A graphic representation of this dilemma is presented in Figure (1). The unshaded areas are those where a "mid-ocean BWE" can be performed. Vessels trading between Central/South America and the U.S., and those between Alaska/Canada and the U.S. are seldom in a position to perform an exchange. This issue is also discussed in the "Results" section of Appendix B.
4. Shipping interests believe that any BWM program must not require extended deviations from an intended voyage in order to comply. Environmental interests recognize the problems these deviations entail and advocate the identification of

“alternative exchange zones” - geographic areas closer to shore and with shallower waters where an exchange would be considered environmentally sound (i.e. taking into account regional hydrographic, temperature, and salinity variations). Both sides agree that the development of alternative treatment methods that are more effective both biologically and economically than BWE is the desired end state.

5. The IMO is considering adopting a definition of BWE that requires a water depth of 500 meters instead of the U.S. criteria of 2000 meters. While there is no clear scientific evidence that the IMO criteria is less protective than the U.S., there is no agreement that it should become part of the U.S. definition. There is consensus that all efforts should be made to arrive at a single international definition based on sound scientific reasoning

## **NBIC REPORT**

In cooperation with the Coast Guard, the NBIC prepared the report titled “Status and Trends of Ballast Water Management in the U.S.: First Biennial Report of the National Ballast Information Clearinghouse, November 2001”. This document (Appendix B) analyzes the BWM information self-reported by ships to the Coast Guard during the period of July 1, 1999 through June 30, 2001 and reaches the following conclusions regarding compliance with the ballast water reporting and management practices by vessels operating outside of the Great Lakes ecosystem.

1. Only 30.4 % of regulated ships submitted reports during the first 24 months that reporting requirements were in effect. Over the two-year period, the monthly compliance rate increased gradually from about 20% to about 40%.
2. About one half (51.2%) of the reporting ships that discharged ballast water performed some degree of ballast water exchange. Over the two-year period, there was little change in the proportion of the reporting vessels that conducted a mid-ocean exchange prior to discharging ballast water. The reasons for not performing BWE were varied and included constraints posed by the vessel's itinerary, as well as ship and crew safety concerns. These are detailed further in Table 5 to Appendix B of this report.

The NBIC looked at compliance with the federal program in California, compared to other areas of the country, and can show that reporting in the federal program went up significantly when the California State program (which included penalties) took effect:

They found that:

1. The percentage of federally regulated ships that submitted reports upon entering ports in California increased from 55% for the first year to 65% for the second. This reflects the implementation at the state level of an identical BWM reporting requirement, but with penalties for non-reporting. While the initial monthly reporting rate in California for the federal program was below 50%, it increased markedly with implementation of the state program, going from 44% in December 1999 to 65% in January 2000, the month the program took effect. A similar increase in reporting was not observed at the same time in any other geographic area of the country.
2. Approximately 65 % of the ships that reported discharging ballast water in California waters performed some degree of ballast water exchange in both the first and second years.

#### **COMPARISON WITH GREAT LAKES PROGRAM**

For comparison purposes, the Coast Guard examined compliance with the mandatory federal program for the Great Lakes ecosystem for the period July 1999 through June 2001 and found that:

1. 100% of regulated ships submitted reports prior to entering the Great Lakes ecosystem;
2. 93% of regulated ships performed the necessary level of active BWE prior to their arrival; and

7% of regulated ships did not perform the necessary level of active BWM prior to their arrival. These were required to take appropriate alternative actions to meet the regulations prior to being allowed to enter.

#### **CONCLUSIONS**

NISA directs the Secretary to determine if the level of reporting by vessels is adequate to assess the compliance with the guidelines. Having (1) reviewed the data collected during the first two years of the program of voluntary BWM guidelines, along with the analysis conducted by the NBIC, and (2) assessed these under the Task Force's criteria for determining the adequacy and effectiveness of such a program, it is the Secretary's determination that the consistently low rate of vessel reporting makes it impossible to accurately assess compliance with the voluntary BWM guidelines.

The resultant lack of data regarding shipboard BWM practices also makes it impossible to accurately assess the guidelines' effectiveness in reducing the introduction and spread of ANS by vessels.

In this situation of low reporting and the resulting inability to make valid program assessments, NISA directs the Secretary to issue regulations making the requirements of the voluntary program mandatory and provide the necessary enforcement.

Comments received from a range of interested and affected parties since the program's implementation indicate there is clearly broad support for a mandatory national BWM program based on the practices contained in the guidelines.

The Coast Guard is currently working on developing such a mandatory program, as required by NISA and supported by stakeholders.

## Section IV

## Future Actions

### **BALLAST WATER PROGRAM**

As mentioned previously in this report, Section 1101(f) of NISA leaves little doubt that the next regulatory actions with regard to BWM are to make the voluntary guidelines mandatory and provide for their enforcement. Balancing the ecological, social, safety and economic concerns of the affected parties, the Coast Guard will implement a robust national BWM program that maximizes the use of existing BWM techniques by all vessels, while fostering the development of new BWT technologies. To accomplish this, the following initial steps will be taken.

### **BALLAST WATER MANAGEMENT REPORT**

The current BWM regime primarily focuses on vessels arriving from outside of the U.S. EEZ with ballast water onboard. In order to more fully understand and respond appropriately to the threat posed by ballast water, the BWM program must also consider:

1. Those vessels that arrive from outside of the U.S. fully loaded with cargo, but eventually take on ballast in U.S. waters and move it to other U.S. waters in conjunction with their cargo operations; and
2. Those vessels that operate solely between U.S. ports.

With this in mind, the Coast Guard will develop regulations to require *all* vessels equipped with ballast tanks that enter U.S. waters after operating beyond the EEZ, *or* are engaged solely in voyages between U.S. ports, to perform appropriate record keeping and reporting.

### **MANDATORY BALLAST WATER MANAGEMENT PRACTICES**

To reduce the amount of unmanaged ballast water exchanged into the coastal areas of the U.S., the Coast Guard will issue regulations requiring vessels equipped with ballast tanks that enter the waters of the United States after operating beyond the EEZ to:

1. Conduct an exchange of ballast water;
2. Discharge ballast water to an approved reception facility;
3. Retain the ballast water on board the vessel;
4. Use an alternate environmentally sound method of ballast water management approved by the Coast Guard; or
5. Under extraordinary conditions, conduct a ballast water exchange within a geographic area agreed to by the Coast Guard.

The above will be in addition to the general precautionary practices requested of vessel operators. These are consistent with IMO's BWM guidelines and can be performed by virtually any vessel.

While these provisions would apply generally, the Coast Guard will also consider whether limited exceptions are appropriate for vessels that are constrained by their routes and the current definition of BWE as discussed below under "Ballast Water Exchange Defined."

## **PENALTIES**

Section 1101(g) of NISA establishes the sanctions for failing to comply with the program's requirements. These include civil and criminal penalties, as well as revocation of clearance.

Recognizing that BWE may not be feasible during a voyage for a variety of reasons, section 1101(k) states "The master of a vessel is not required to conduct a ballast water exchange if the master decides that the exchange would threaten the safety or stability of the vessel, its crew, or its passengers because of adverse weather, vessel architectural design, equipment failure, or any other extraordinary conditions." This exemption will remain a central tenet in implementation and enforcement of the BWM program. To thwart abuse of this exemption, the Coast Guard will monitor and verify the appropriateness of its use.

## **BALLAST WATER EXCHANGE DEFINED**

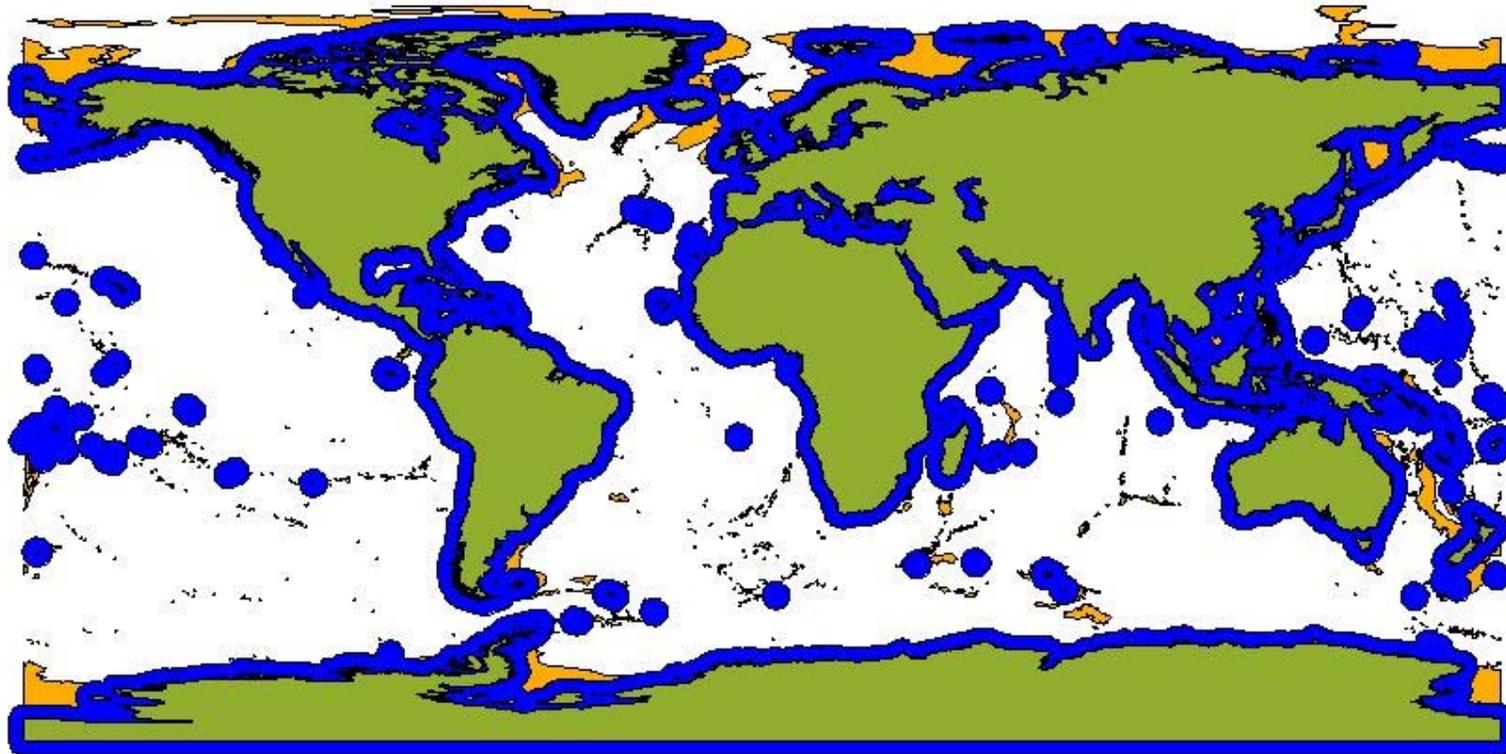
These regulations will include a definition of ballast water exchange that clarifies where and how BWE should be conducted. Of particular concern is how to deal with the fact that a large percentage of ship voyages do not go into waters 200 miles from shore or with a depth of at least 2000 meters. In addition, many vessels that transit such waters do not do so for a sufficient period of time to conduct a complete exchange. Requiring ships to deviate from their routes and schedules would likely have significant direct costs, as well as unintended secondary logistical effects in the nation's supply chain.

## **BALLAST WATER TREATMENT TECHNOLOGY**

Recognizing the shortcomings of BWE as a management method, the Coast Guard will continue to focus its efforts on establishing a quantitative BWT performance standard; protocols for testing, verifying and reporting on BWT technologies; and facilitating experimental shipboard installation and operation of promising BWT technologies. The Coast Guard recognizes that success in this area requires cooperation with other federal and state agencies, as well as industry and environmental interests, and is committed to engaging them in reaching mutually beneficial and satisfactory solutions to this difficult challenge.

Figure 1 - Areas Where Ballast Water Exchange Can Be Conducted

Unshaded areas are those where a mid-ocean ballast water exchange can be performed.



## Table 1 - List of Acronyms

ANS	Aquatic Nuisance Species
BWE	Ballast Water Exchange
BWM	Ballast Water Management
BWT	Ballast Water Treatment
EEZ	Exclusive Economic Zone
ETV	Environmental Technology Verification
IMO	International Maritime Organization
NABS	National Ballast Survey
NANPCA	Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990
NBIC	National Ballast Information Clearinghouse
NISA	National Invasive Species Act of 1996
SERC	Smithsonian Environmental Research Center
Secretary	Secretary of Transportation
Task Force	Aquatic Nuisance Species Task Force

**33 CFR Part 151 Subpart D--Ballast Water Management for Control of Nonindigenous Species in waters of the United States.**

Sec.

151.2000 What is the purpose of this subpart?

151.2005 To which vessels does this subpart apply?

151.2010 Which vessels are exempt from the mandatory requirements?

151.2015 Is a vessel in innocent passage exempt from the mandatory requirements?

151.2020 To what ballast water does this subpart apply?

151.2025 What definitions apply to this subpart?

151.2030 Who is responsible for determining when to use the safety exemption?

151.2035 What are the voluntary ballast water management guidelines?

151.2040 What are the mandatory requirements for vessels equipped with ballast tanks that enter the waters of the United States after operating beyond the Exclusive Economic Zone (EEZ)?

151.2041 Equivalent Reporting Methods for vessels other than those entering the Great Lakes or Hudson River

151.2045 What are the mandatory recordkeeping requirements for vessels equipped with ballast tanks that enter the waters of the United States after operating beyond the Exclusive Economic Zone (EEZ)?

151.2050 What methods are used to monitor compliance with this subpart?

151.2055 Where are the Alternate Exchange Zones Located? (Reserved)

151.2060 What must each application for approval of an alternative compliance technology contain?(Reserved)

151.2065 What is the standard of adequate compliance determined by the ANSTF for this subpart? (Reserved)

Appendix to Subpart D of Part --Ballast Water Reporting

Form and Instructions for Ballast Water Reporting Form

Subpart D--Ballast Water Management for Control of Nonindigenous Species in Waters of the United States

Authority: 16 U.S.C. 4711; 49 CFR 1.46.

§ 151.2000 What is the purpose of this subpart?

This subpart implements the provisions of the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 (NANPCA) (16 U.S.C. 4701-4751), as amended by the National Invasive Species Act of 1996 (NISA).

§ 151.2005 To which vessels does this subpart apply?

(a) Sections 151.2000 through 151.2035(a) of this subpart apply to all vessels, U.S. and foreign, equipped with ballast tanks that operate in the waters of the United States.

(b) In addition, §§151.2035(b) through 151.2065 apply to all vessels, U.S. and foreign, equipped with ballast tanks, that enter the waters of the United States after operating beyond the Exclusive Economic Zone, except those vessels exempted in §151.2010 and §151.2015.

§ 151.2010 Which vessels are exempt from the mandatory requirements?

Four types of vessels are exempt from the requirements in §§ 151.2040 and 151.2045:

(a) A crude oil tanker engaged in the coastwise trade.

(b) A passenger vessel equipped with a functioning treatment system designed to kill aquatic organisms in the ballast water. The treatment system must be utilized for ballast water discharged into the waters of the United States and it must operate as designed.

Reflects changes to Subpart D contained in Final Rule

## APPENDIX A

(c) A Department of Defense or Coast Guard vessel subject to the requirements of section 1103 of the Act, or any vessel of the Armed Forces, as defined in the Federal Water Pollution Control Act( 33 U.S.C. 1322(a)) that is subject to the "Uniform National Discharge Standards for Vessels of the Armed Forces" (33 U.S.C. 1322(n)).

(d) A vessel that will discharge ballast water or sediments only at the same location where the ballast water or sediments originated. The ballast water or sediments must not mix with ballast water or sediments other than those taken on in areas more than 200 nautical miles from any shore and in waters more than 2,000 meters (6,560 feet, 1,093 fathoms) deep.

### § 151.2015 Is a vessel in innocent passage exempt from the mandatory requirements?

A foreign vessel merely traversing the territorial sea of the United States (i.e., not entering or departing a U.S. port, or not navigating the internal waters of the U.S.) is exempt from the requirements of §§ 151.2040 and 151.2045, however such vessels are requested not to discharge ballast water into the waters of the United States unless they have followed the voluntary guidelines of § 151.2035.

### § 151.2025 What definitions apply to this subpart?

(a) Unless otherwise stated in this section, the definitions in 33 CFR 151.1504, 33 CFR 160.203, and the United Nations Convention on the Law of the Sea apply to this part.

(b) As used in this part--

ANSTF means the Aquatic Nuisance Species Task Force mandated under the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 (NANPCA).

Captain of the Port (COTP) means the Coast Guard officer designated as the COTP, or a person designated by that officer, for the COTP zone covering the first U.S. port of destination. These COTP zones are listed in 33 CFR part 3.

Exchange means to replace the water in a ballast tank using one of the following methods:

(1) Flow through exchange means to flush out ballast water by pumping in mid-ocean water at the bottom of the tank and continuously overflowing the tank from the top until three full volumes of water has been changed--to minimize the number of original organisms remaining in the tank.

(2) Empty/refill exchange means to pump out the ballast water taken on in ports, estuarine, or territorial waters until the tank is empty, then refilling it with mid-ocean water; masters/operators should pump out as close to 100 percent of the ballast water as is safe to do so.

IMO guidelines mean the Guidelines for the Control and Management of Ships' Ballast Water to Minimize the Transfer of Harmful Aquatic Organisms and Pathogens (IMO Resolution A.868 (20), adopted November 1997).

NANCPA means the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990.

NBIC means the National Ballast Water Information Clearinghouse operated by the Coast Guard and the Smithsonian Environmental Research Center as mandated under NISA.

NISA means the National Invasive Species Act of 1996, which reauthorized and amended NANCPA.

United States means the States, the District of Columbia, the Commonwealth of Puerto Rico, Guam, American Samoa, the Virgin Islands, and the Trust Territory of the Pacific Islands.

Voyage means any transit by a vessel destined for any United States port from a port or place outside of the EEZ, including intermediate stops at a port or place within the EEZ. For the purpose of this rule, a transit by a vessel from a United States port to any other United States port, if at any time the vessel operates outside the EEZ or equivalent zone of Canada, is also considered a voyage.

## APPENDIX A

Waters of the United States means waters subject to the jurisdiction of the United States as defined in 33 CFR §2.05-30, including the navigable waters of the United States. For this regulation, the navigable waters include the territorial sea as extended to 12 nautical miles from the baseline, pursuant to Presidential Proclamation No. 5928 of December 27, 1988.

### § 151.2030 Who is responsible for determining when to use the safety exemption?

- (a) The master, operator, or person-in-charge of a vessel is responsible for the safety of the vessel, its crew, and its passengers.
- (b) The master, operator, or person-in-charge of a vessel is not required to conduct a ballast water management practice (including exchange), if the master decides that the practice would threaten the safety of the vessel, its crew, or its passengers because of adverse weather, vessel design limitations, equipment failure, or any other extraordinary conditions. If the master uses this section, and the--
- (1) Vessel is on a voyage to the Great Lakes or Hudson River, the vessel must comply with the requirements of §151.1514 of subpart C of this part (Ballast water management alternatives under extraordinary conditions); or
  - (2) Vessel is on a voyage to any port other than the Great Lakes or Hudson River, the vessel shall not be required to perform a ballast water management practice which the master has found to threaten the safety of the vessel, its crew, or its passengers because of adverse weather, vessel design limitations, equipment failure, or any other extraordinary conditions.
- (c) Nothing in this subpart relieves the master, operator, or person-in-charge of a vessel, of the responsibility for ensuring the safety and stability of the vessel or the safety of the crew and passengers, or any other responsibility.

### § 151.2035 What are the voluntary ballast water management guidelines?

- (a) Masters, owners, operators, or persons-in-charge of all vessels equipped with ballast water tanks that operate in the waters of the United States are requested to take the following voluntary precautions to minimize the uptake and the release of harmful aquatic organisms, pathogens, and sediments:
- (1) Avoid the discharge or uptake of ballast water in areas within or that may directly affect marine sanctuaries, marine preserves, marine parks, or coral reefs.
  - (2) Minimize or avoid uptake of ballast water in the following areas and situations:
    - (i) Areas known to have infestations or populations of harmful organisms and pathogens (e.g., toxic algal blooms).
    - (ii) Areas near sewage outfalls.
    - (iii) Areas near dredging operations.
    - (iv) Areas where tidal flushing is known to be poor or times when a tidal stream is known to be more turbid.
    - (v) In darkness when bottom-dwelling organisms may rise up in the water column.
    - (vi) Where propellers may stir up the sediment.
  - (3) Clean the ballast tanks regularly to remove sediments. Clean the tanks in mid-ocean or under controlled arrangements in port, or at dry dock. Dispose of your sediments in accordance with local, State, and Federal regulations.

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- (4) Discharge only the minimal amount of ballast water essential for vessel operations while in the waters of the United States.
- (5) Rinse anchors and anchor chains when you retrieve the anchor to remove organisms and sediments at their place of origin.
- (6) Remove fouling organisms from hull, piping, and tanks on a regular basis and dispose of any removed substances in accordance with local, State and Federal regulations.
- (7) Maintain a ballast water management plan that was developed specifically for the vessel.
- (8) Train the master, operator, person-in-charge, and crew, on the application of ballast water and sediment management and treatment procedures.

(b) In addition to the provisions of §151.2035(a), you (the master, operator, or person-in-charge of a vessel) are requested to employ at least one of the following ballast water management practices, if you carry ballast water, that was taken on in areas less than 200 nautical miles from any shore or in waters less than 2000 meters deep, into the waters of the United States after operating beyond the EEZ:

- (1) Exchange ballast water on the waters beyond the EEZ, from an area more than 200 nautical miles from any shore, and in waters more than 2,000 meters (6,560 feet, 1,093 fathoms) deep, before entering waters of the United States.
- (2) Retain the ballast water on board the vessel.
- (3) Use an alternative environmentally sound method of ballast water management that has been approved by the Coast Guard before the vessel begins the voyage. Submit the requests for approval of alternative ballast water management methods to the Commandant (G-MSO-4), U.S. Coast Guard Headquarters, 2100 Second Street SW., Washington, DC 20593-0001. The phone number is 202-267-0500.
- (4) Discharge ballast water to an approved reception facility.
- (5) Under extraordinary conditions, conduct a ballast water exchange within an area agreed to by the COTP at the time of the request.

§151.2040 What are the mandatory requirements for vessels equipped with ballast tanks that enter the waters of the United States after operating beyond the Exclusive Economic Zone (EEZ)?

(a) The master, owner, operator, person-in-charge of a vessel bound for the Great Lakes or Hudson River, which has operated beyond the EEZ during any part of its voyage, regardless of intermediate ports of calls within the waters of the United States or Canada, must comply with paragraphs (c) through (f) of this section, all of § 151.2045, and with the provisions of subpart C of this part.

(b) A vessel engaged in the foreign export of Alaskan North Slope Crude Oil must comply with paragraphs (c) through (f) of this section, all of § 151.2045, and with the provisions of 15 CFR 754.2(j)(1)(iii). That section (15 CFR 754.2(j)(1)(iii)) requires a mandatory program of deep water ballast exchange (i.e., at least 2,000 meters water depth and recordkeeping), unless doing so would endanger the safety of the vessel or crew.

(c) The master, owner, operator, agent, or person-in-charge of a vessel entering the waters of the United States after operating beyond the EEZ, unless specifically exempted by §§151.2010 or 151.2015, must provide the information required by §151.2045 in electronic or written form to the Commandant, U.S. Coast Guard or the appropriate COTP as follows:

- (1) For a United States or Canadian Flag vessel bound for the Great Lakes. You must fax the required information to the COTP Buffalo, Massena Detachment (315-764-3283), at least 24 hours before the vessel arrives in Montreal, Quebec.

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- (2) For a foreign flagged vessel bound for the Great Lakes. You must—
  - (i) Fax the required information to the COTP Buffalo, Massena Detachment (315-764-3283), at least 24 hours before the vessel arrives in Montreal, Quebec; or
  - (ii) Complete the ballast water information section of the St. Lawrence Seaway required "Pre-entry Information from Foreign Flagged Vessels Form" and submit it in accordance with the applicable Seaway Notice.
- (3) For a vessel bound for the Hudson River north of the George Washington Bridge. You must telefax the information to the COTP New York at 718-354-4249 before the vessel enters the waters of the United States (12 miles from the baseline).
- (4) For a vessel not addressed in paragraphs (c)(1), (c)(2), and (c)(3) of this section. Before the vessel arrives at the first port of call in the waters of the United States, you must-
  - (i) Mail the information to U.S. Coast Guard, c/o Smithsonian Environmental Research Center (SERC), P.O. Box 28, Edgewater, MD 21037-0028; or
  - (ii) Transmit the information electronically to the NBIC at <http://invasions.si.edu/ballast.htm> or e-mail it to [ballast@serc.si.edu](mailto:ballast@serc.si.edu); or
  - (iii) Fax the information to the Commandant, U.S. Coast Guard, c/o the NBIC at 301-261-4319.
  - (iv) A single report that includes the ballast discharge information for all U.S. ports that will be entered during this voyage will be accepted unless the vessel exits the EEZ during transits.

(d) If the information submitted in accordance with paragraph (c) of this section changes, you must submit an amended form before the vessel departs the waters of the United States.

(e) This subpart does not authorize the discharge of oil or noxious liquid substances (NLS) in a manner prohibited by United States or international laws or regulations. Ballast water carried in any tank containing a residue of oil, NLS, or any other pollutant must be discharged in accordance with the applicable regulations.

(f) This subpart does not affect or supersede any requirement or prohibition pertaining to the discharge of ballast water into the waters of the United States under the Federal Water Pollution Control Act (33 U.S.C. 1251 to 1376).

### §151.2041 Equivalent Reporting Methods for vessels other than those entering the Great Lakes or Hudson River

(a) For ships required to report under §151.2040(c)(4) the Chief, Environmental Standards Division (G-MSO-4), acting for the Assistant Commandant for Marine Safety and Environmental Protection (G-M) may, upon receipt of a written request, consider and approve alternative methods of reporting if:

- (1) Such methods are at least as effective as that required by §151.2040(c)(4); and
- (2) Compliance with the requirement is economically or physically impractical.

(b) The Chief, Environmental Standards Division (G-MSO-4) will take approval or disapproval action on the request submitted in accordance with paragraph (a) of this section within 30 days of receipt of the request.

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### §151.2045 What are the mandatory recordkeeping requirements for vessels equipped with ballast tanks that enter the waters of the United States after operating beyond the Exclusive Economic Zone (EEZ)?

(a) The master, owner, operator, or person in charge of a vessel entering the waters of the United States after operating beyond the EEZ, unless specifically exempted by §§151.2010 or 151.2015 must keep written, records that include the following information (Note: Ballast tank is any tank or hold that carries ballast water regardless of design):

- (1) Vessel information. Include the—
  - (i) Name;
  - (ii) International Maritime Organization (IMO) Number (official number if IMO number not issued);
  - (iii) Vessel type;
  - (iv) Owner or operator;
  - (v) Gross tonnage;
  - (vi) Call sign; and
  - (vii) Port of Registry (Flag).
- (2) Voyage information. Include the date and port of arrival, vessel agent, last port and country of call, and next port and country of call.
- (3) Total ballast water information. Include the total ballast water capacity, total volume of ballast water on board, total number of ballast water tanks, and total number of ballast water tanks in ballast. Use units of measurements such as metric tons (MT), cubic meters (m<sup>3</sup>), long tons (LT), and short tons (ST).
- (4) Ballast Water Management. Include the total number of ballast tanks/holds that are to be discharged into the waters of the United States or to a reception facility. If an alternative ballast water management method is used, please note the number of tanks that were managed using an alternative method, as well as the type of method used. Indicate whether the vessel has a ballast water management plan and IMO guidelines on board, and whether the ballast water management plan is used.
- (5) Information on ballast water tanks that are to be discharged into the waters of the United States or to a reception facility. Include the following:
  - (i) The origin of ballast water. This includes date(s), location(s), volume(s) and temperature(s) [If a tank has been exchanged, list the loading port of the ballast water that was discharged during the exchange.].
  - (ii) The date(s), location(s), volume(s), method, thoroughness (percentage exchanged if exchange conducted), sea height at time of exchange if exchange conducted, of any ballast water exchanged or otherwise managed.
  - (iii) The expected date, location, volume, and salinity of any ballast water to be discharged into the waters of the United States or a reception facility.
- (6) Discharge of Sediment. If sediment is to be discharged within the jurisdiction of the United States include the location of the facility where the disposal will take place.
- (7) Certification of Accurate Information. Include the master, owner, operator, person in charge, or responsible officer's printed name, title, and signature attesting to the accuracy of the information provided and certifying compliance with the requirements of this subpart.
- (8) Change to Previously Submitted Information.

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- (i) Indicate whether the information is a change to information previously submitted for this voyage.
- (ii) The master, owner, operator, or person in charge of a vessel subject to this section, must retain a signed copy of this information on board the vessel for 2 years.
- (iii) The information required of this subpart may be used to satisfy the ballast water recordkeeping requirements for vessels subject to § 151.2040(a) and (b).
- (iv) A sample form and the instructions for completing the form are in the appendix to this subpart. If you complete the “Ballast Water Reporting Form” contained in the IMO Guidelines or complete the ballast water information section of the St. Lawrence Seaway required “Pre-entry Information Flagged Vessels Form,” then you have met the requirements of this section.

### § 151.2050 What methods are used to monitor compliance with this subpart?

(a) The COTP may take samples of ballast water and sediment, examine documents, and make other appropriate inquiries to assess the compliance of any vessel subject to this subpart.

(b) The master, owner, operator, or person in charge of a vessel subject to this section, shall make available to the COTP the records required by § 151.2045 upon request.

(c) The NBIC will compile the data obtained from submitted reports. This data will be used, in conjunction with existing databases on the number of vessel arrivals, to assess vessel reporting rates.

### § 151.2055 Where are the alternate exchange zones located?

(Reserved)

### § 151.2060 What must each application for approval of an alternative compliance technology contain?

(Reserved)

### § 151.2065 What is the standard of adequate compliance determined by the ANSTF for this subpart?

(Reserved)

## **Appendix to Subpart D of Part 151--Ballast Water Reporting Form and Instructions for Ballast Water Reporting Form**

### **INSTRUCTIONS FOR BALLAST WATER REPORTING FORM**

(Please write in English and PRINT legibly.)

**Is this an Amended Ballast Reporting Form?:** Check Yes or No. Amendments should be submitted if there are any differences between actual ballast discharges and discharge information reported in a prior form. Please mark “Yes” if this form amends a previously submitted ballast reporting form.

### *SECTION 1. VESSEL INFORMATION*

**Vessel Name:** Print the name of the vessel clearly.

**IMO Number:** Fill in identification number of the vessel used by the International Maritime Organization.

**Owner:** Write in the name of the registered owner(s) of the vessel. If under charter, enter Operator name.

**Type:** List specific vessel type. Use the following abbreviations: bulk (**bc**), ro-ro (**rr**), container (**cs**), tanker (**ts**), passenger (**pa**), oil/bulk ore (**ob**), general cargo (**gc**), reefer (**rf**). Write out any additional vessel types.

**GT:** What is the Gross Tonnage of the vessel?

**Call Sign:** Write in the official call sign.

Reflects changes to Subpart D contained in Final Rule

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**Flag:** Fill in the full name of the country under whose authority the ship is operating. No abbreviations please.

### SECTION 2. VOYAGE INFORMATION

**Arrival Port:** Write in the name of your first port of call after entering the U.S. EEZ or St. Lawrence Seaway. No abbreviations. **Arrival Date:** Fill in the arrival date to the above port. Please use European date format (DDMMYY).

**Agent:** List agent used for current port.

**Last Port:** Fill in the last port at which the vessel called immediately before entering the U.S. EEZ. No abbreviations please.

**Country of Last Port:** Fill in the last country at which the vessel called immediately before entering the U.S. EEZ. No abbreviations please.

**Next Port:** Fill in the port at which the vessel will call immediately after departing the current port (“Current Port”=“Arrival Port” above). No abbreviations please.

**Country of Next Port:** Fill in the country of “Next Port” at which the vessel will call immediately after current port. No abbreviations please.

### SECTION 3. BALLAST WATER

**Total Ballast Water on Board:**

**Volume:** What was the total volume of ballast water on board upon arrival into the waters of U.S. EEZ? Do not count potable water.

**Units:** Please include volume units (m<sup>3</sup>, MT, LT, ST).

**Number of Tanks in Ballast:** Count the number of ballast tanks and holds with ballast as vessel enters waters inside the United States EEZ.

**Total Ballast Water Capacity:**

**Volume:** What is the maximum volume of ballast water used when no cargo is on board?

**Units:** Please include volume units (m<sup>3</sup>, MT, LT, ST).

**Total Number of Tanks on Ship:** Count all tanks and holds that can carry ballast water (do not include tanks that carry potable water).

### SECTION 4. BALLAST WATER MANAGEMENT

**Total No. of tanks to be discharged:** Count only tanks and holds with ballast to be discharged into waters inside the United States EEZ or into an approved reception facility. Count all tanks and holds separately (e.g., port and starboard tanks should be counted separately).

**Of tanks to be discharged, how many Underwent Exchange:** Count all tanks that are to be discharged into waters of the United States or into an approved reception facility.

**Of tanks to be discharged, how many Underwent Alternative Management:** Count all tanks that are to be discharged into waters of the United States or an approved reception facility.

**Please specify alternative method(s) used, if any:** Specifically, describe methods used for ballast management.

**If no ballast treatment conducted, state reason why not:** This applies to all tanks and holds being discharged into waters of the United States or into an approved reception facility.

**Ballast Management Plan on board?:** Is there a written document on board, specific to your vessel, describing the procedure for ballast management? This should include safety and exchange procedures (usually provided by vessel’s owner or operator). Check Yes or No.

**Management Plan implemented?:** Do you follow the above management plan? Check Yes or No.

**IMO Ballast Water Guidelines on board?:** Is there a copy of the International Maritime Organization (IMO) Ballast Water Guidelines on board this vessel (i.e. “Guidelines for the Control and Management of Ship’s Ballast Water to Minimize the Transfer Aquatic Organisms and Pathogens”, [Res. A.868(20)])? Check Yes or No.

## SECTION 5. BALLAST WATER HISTORY

**(Record all tanks to be deballasted in port state of arrival: If none, go to #6)**

**Tanks/Holds:** Please list all tanks and holds that you have discharged or plan to discharge into waters of the United States or

into an approved reception facility (write out, or use codes listed below table). Follow each tank across the page listing all source(s), exchange events, and/or discharge events separately. List each tank on a separate line. Port and starboard tanks with identical ballast water histories may be included on same line. Please use an additional page if necessary, being careful to include ship name, date, and IMO number at the top of each. For tanks with multiple sources: list 3 largest sources from last 30 days on separate lines. If more than 3 sources, include a 4th line for the respective tank(s) that indicated "Multiple" in port column and list the remaining tank volume not included in the 3 largest sources (i.e., total tank volume minus volume of the 3 largest sources). See example #1 on sample ballast reporting form.

### -BW SOURCES-

**Date:** Record date of ballast water uptake. Use European format (DDMMYY).

**Port or latitude/longitude:** Record location of ballast water uptake, no abbreviations for ports.

**Volume:** Record total volume of ballast water uptake, with volume units.

**Temp:** Record water temperature at time of ballast water uptake, in degrees Celsius (include units).

### -BW MANAGEMENT PRACTICES-

**Date:** Date of ballast water management practice. If exchanges occurred over multiple days, list the day when exchanges were completed. Use European format (DDMMYY).

**Endpoint or latitude/longitude:** Report location of ballast water management practice. If an exchange occurred over an extended distance, list the end point latitude and longitude.

**Volume:** Report total volume of ballast water moved (i.e., gravitated and pumped into tanks, discharged to reception facility) during management practice, with units.

**% Exch.:** (Note: for effective flow through exchange, this value should be at least 300%).

$$\% \text{ Exchange} = \frac{\text{Total Volume added by Refill or Flow Through}}{\text{Capacity of Ballast Tank or Hold}} \times (100\%)$$

**Method:** Indicate management method using code (ER = empty/refill, FT = flow through, ALT = alternative method).

**Sea Ht . (m):** Estimate the sea height in meters at the time of the ballast water exchange if this method was used. (Note: this is the combined height of the wind-seas and swell, and does not refer to water depth).

### -BW DISCHARGES-

**Date:** Date of ballast water discharge. Use European format (DDMMYY).

**Port or latitude/longitude:** Report location of ballast water discharge, no abbreviations for ports.

**Volume:** Report volume of ballast water discharged, with units.

**Salinity:** Document salinity of ballast water at the time of discharge, with units (i.e., specific gravity (sg) or parts per thousand (ppt)).

## SECTION 6. TITLE AND SIGNATURE

**Responsible officer's name and title (printed) and signature:** Print name and title, include signature.



## Where to send this form.

### Vessels bound for Great Lakes:

#### United States or Canadian Flag vessel bound for the Great Lakes

Fax the form to the COTP Buffalo, Massena Detachment **315-764-3283** at least 24 hours before the vessel arrives in Montreal, Quebec.

#### Any other Flag vessel bound for the Great Lakes

Fax the form to the COTP Buffalo, Massena Detachment **315-764-3283** at least 24 hours before the vessel arrives in Montreal, Quebec, or;

Complete the ballast water information section of the St. Lawrence Seaway required "Pre-entry Information from Foreign Flagged Vessels Form" and submit it in accordance with the applicable Seaway Notice.

### Vessels bound for the Hudson River North Of George Washington Bridge

#### Vessel bound for the Hudson River north of the George Washington Bridge

Fax the form to the COTP New York at **718-354-4249** before the vessel enters the waters of the United States (12 miles from the baseline).

### Vessels bound for all other United States Ports

#### Vessel bound for all ports within the waters of the United States other than the Great Lakes or Hudson River north of the George Washington Bridge

Before the vessel arrives at the first port of call in the waters of the United States send the form by one of the three following methods:

- Mail the form to the **U.S. Coast Guard, c/o Smithsonian Environmental Research Center (SERC), P.O. Box 28, Edgewater, MD 21037-0028;**
- Transmit the form electronically to the National Ballast Information Clearinghouse (NBIC) at <http://invasions.si.edu/ballast.htm> or e-mail it to [ballast@serc.si.edu](mailto:ballast@serc.si.edu); or
- Fax the form to the Commandant, U.S. Coast Guard, c/o the NBIC at **301-261-4319.**

**If any information changes, send an amended form before the vessel departs the waters of the United States.**

An agency may not conduct or sponsor, and a person is not required to respond to a collection of information unless it displays a valid OMB control number. The Coast Guard estimates that the average burden for this report is 35 minutes. You may submit any comments concerning the accuracy of this burden estimate or any suggestions for reducing the burden to: Commandant (G-MSO), U.S. Coast Guard, 2100 Second St. SW, Washington, DC 20593-0001, or Office of Management and Budget, Paperwork Reduction Project (2115-0598), Washington, DC 20503.

APPENDIX B

**STATUS AND TRENDS OF BALLAST WATER MANAGEMENT  
IN THE UNITED STATES**

**FIRST BIENNIAL REPORT  
OF THE  
NATIONAL BALLAST INFORMATION CLEARINGHOUSE**

Submitted to United States Coast Guard

16 November 2001

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A. Arnwine, E. Collinetti, E. Wells.

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### LIST OF ABBREVIATIONS

<b>BOB</b>	Ballast On Board
<b>CFR</b>	Code of Federal Regulations
<b>COTPZ</b>	Captain of the Port Zone
<b>EEZ</b>	Exclusive Economic Zone
<b>IMO</b>	International Maritime Organization
<b>MARAD</b>	Maritime Administration
<b>MSIS</b>	U.S. Coast Guard Marine Safety Inspection Survey
<b>mt</b>	metric ton
<b>NABS</b>	National Ballast Survey
<b>NIS</b>	Nonindigenous Species
<b>NISA</b>	The National Invasive Species Act of 1996, P.L 104-332
<b>NOBOB</b>	No Ballast On Board
<b>SERC</b>	Smithsonian Environmental Research Center
<b>USCG</b>	United States Coast Guard

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### EXECUTIVE SUMMARY

#### **BACKGROUND**

1. Biological invasions by non-native, invasive species are having significant ecological, economic, and human health impacts. Importantly, the rate of new invasions appears to be increasing.
2. For coastal marine ecosystems, the ballast water of ships is known to be an important mechanism for the transfer of non-native species, which are entrained unintentionally at one port and released at another.
3. Under the National Invasive Species Act of 1996 (NISA), Congress requires ships entering U. S. waters from outside the Exclusive Economic Zone (EEZ) to report ballast water management practices, including the retention of ballast water on board. (This reporting requirement excludes ships arriving to the Great Lakes ecosystem, as these are addressed separately by existing regulations.)
4. NISA also requests the masters of these ships to follow a suite of voluntary ballast water management guidelines to reduce the risk of introducing foreign organisms to the waters of the U. S. via discharged ballast water. The guidelines include the following actions:
  - (a) exchanging ballast water obtained from harbors or other coastal areas outside of the U.S. EEZ for mid-ocean water (obtained from areas at least 200 miles from any shore and with at least 2,000 meters of depth) prior to its release in U.S. coastal waters;
  - (b) retention (i.e. no discharge) of unexchanged ballast water that is derived from overseas coastal areas;
  - (c) use of an alternative ballast water management practice determined by the U.S. Coast Guard to be at least as effective as ballast water exchange in preventing invasions by nonindigenous species.
5. Ships are required to submit reports on ballast water management and discharge to the National Ballast Information Clearinghouse (hereafter Clearinghouse), a collaborative effort of the U. S. Coast Guard and the Smithsonian Environmental Research Center for the collection, management, and analysis of nationwide data on ballast water management and coastal invasions, pursuant 33 CFR §151.2045.
6. To determine the rate of compliance with the reporting requirement, the Clearinghouse compares the submitted reports with data on ship arrivals from the database of U. S. Foreign Waterborne Transportation Statistics maintained by the Department of Transportation's Maritime Administration (MARAD). The MARAD database is composed of data collected by the U. S. Customs Service and the Army Corps of Engineers.
7. To determine the rate of compliance with the voluntary ballast water management guidelines, the Clearinghouse analyzes the submitted data and estimates: (a) the number of vessels reporting discharge of ballast water according to ballast management practices (i.e., no exchange, discharge with some exchange, alternative treatment, or retention of ballast water) and, (b) the volume and proportion of discharged ballast water that underwent the various management practices.
8. To verify the accuracy of information reported by vessels, and to further educate the shipping industry about ballast water management requirements and guidelines under 33 CFR §151.2045, the U.S. Coast Guard implemented independent Verification Surveys aboard randomly selected arriving vessels. These surveys were carried out as a pilot program over the past 24 months.

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9. This biennial report is prepared to inform the U.S. Coast Guard, the Secretary of Transportation, and the U.S. Congress of the current status and trends for nationwide ballast water reporting, delivery, and management.

### **RESULTS**

#### ***A. Compliance with Reporting***

10. Nationwide compliance with reporting was low over the first 24 months (1 July 1999 – 30 June 2001) that mandatory reporting was in effect. Only 30.4% of the vessels that entered U. S. waters from outside the EEZ filed reports with the Clearinghouse, as required by the U.S. Coast Guard.
11. Compliance with reporting varied greatly among geographic regions, during the first 24 months. Compliance rates by region were as follows: Alaska – 20.8%; Caribbean – 16.6%; East Coast – 29.0%; Gulf Coast – 17.1%; West Coast – 66.5%; and Pacific Islands – 50.4% (calculated for Hawaiian ports only, as MARAD data do not include Guam).
12. Among individual Captain of the Port Zones (COTPZs) of the U.S. Coast Guard, compliance with reporting ranged from 87.9% in San Francisco, California to 10.1% in Providence, Rhode Island.
13. For the entire U.S., compliance with reporting did not improve substantially from the first year to the second (28.3% and 32.4%, respectively).
14. Among the three continental U.S. coastal regions, the Gulf Coast showed the least improvement in reporting compliance between years (0.5%) followed by the East Coast (5.2%).
15. On the West Coast (of the contiguous U. S.), compliance with the reporting requirement increased markedly (15.3%) between years, resulting primarily from an increase in California (which receives most ship arrivals). This increase was coincident with implementation of California state law, requiring submission of copies of the federal ballast water management reports to the State Lands Commission and authorizing monetary and criminal penalties for noncompliance.

#### ***B. Compliance with Voluntary Guidelines***

16. Due to the poor nationwide reporting rate (30.4%), it remains difficult to estimate reliably the temporal and geographic patterns for (a) ballast water delivery and (b) use of the voluntary ballast water management practices.
17. Despite current low nationwide reporting, the National Ballast Survey and the Clearinghouse database were designed explicitly to provide fine-grained information on patterns of ballast water management and delivery by geographic location (port, coast, traffic pattern), time (month, year, and across years) and vessel type. Thus, the system is in place to evaluate and track management patterns across the country.
18. Here, we report some coarse patterns of ballast water management that emerge from the limited reports to date. However, as reporting rates rise and concomitant uncertainty diminishes, the NABS database will better describe the behavior of commercial vessels arriving to the U.S.
19. Of the 28,988 foreign arrivals that submitted reports from 1 July 1999 to 30 June 2001, 73.6% indicated no intention to discharge ballast water within U. S. territory, 12.9% declared no exchange of ballast water prior to discharge, and 13.0% of the reporting vessels declared some degree of ballast water exchange prior to discharge.

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20. Thus, of the 7,652 vessels that reported discharge of ballast water in U.S. waters, about half (51.2%) indicated some degree of mid-ocean exchange and 48.8% indicated discharge with no prior exchange.
21. Nationwide, approximately 29.7% (11.1 million metric tons, or mt) of the ballast water from foreign arrivals was reported as discharged into the U. S. without undergoing any exchange.
22. Of the vessels that reported no intent to discharge ballast water upon arrival, most carried ballast water. Only 12.8% (3,712 of 21,336 vessels) was reported as No Ballast on Board, or NOBOB.
23. Compliance with the voluntary guidelines varied greatly among regions. For the West Coast, most ships that discharged ballast reported it had undergone exchange (72.3% of ships), and most ballast water discharged was reported to have undergone some exchange (85.2% of the total volume). In contrast, on the East Coast, most ships (70.4%) that discharged ballast water reported they had not undertaken exchange, although most of the discharged ballast water had reportedly undergone some exchange (53.3% of total volume).
24. Compliance with voluntary guidelines also varied considerably by port system, or COPTZ. For example: Portland, Oregon received the highest volume of ballast water, (6.60 million mt) of which 91.5% underwent some degree of mid-ocean exchange prior to discharge; Juneau, Alaska had the highest percent of reported discharged ballast water that had undergone some exchange (98.1% of 113,050 mt); and Portland, Maine had the lowest percent of reported discharge that had undergone any exchange (0% of 17,559 mt).
25. Analysis of the locations reported for completion of ballast exchange, using a geographic information system, indicates a significant proportion of the reported exchange occurred in coastal areas (< 200 mi offshore), rather than mid-ocean as requested.

### *C. Verification Surveys*

26. The U.S. Coast Guard pilot program for Verification Surveys is currently being evaluated, to explore the best options to verify accuracy of reporting. The pilot program tested the feasibility of a stratified, random survey that was implemented by U.S. Coast Guard across all 30 COPTZs in the country. The pending analyses will be used to examine both opportunities and constraints associated with ship arrival schedules, availability of personnel for verification, and specific methods.

## **CONCLUSIONS**

27. Nationwide compliance with the mandatory reporting requirement remains low (34.7% for the month of June 2001, and 30.4% for the cumulative two year period) and exhibits no marked improvement over the last 12 months.
28. On the West Coast, compliance with reporting increased over the first 12 months to approximately 75%, coinciding with initiation of state regulations in California that (a) impose penalties for non-compliance and (b) include an active boarding program that targets 20-30% of arrivals. Compliance has increased between the first and second year for California, as well as Washington and Oregon (which have also passed state regulations).
29. Despite increased reporting on the West Coast, this represents only a small fraction (14%) of the nationwide ship arrivals from outside of the EEZ, and reporting did not increase appreciably along the Gulf Coast and East Coast (38% and 30% of all arrivals, respectively).

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30. At the present rate of improvement for reporting, full compliance with reporting will not occur for decades.
31. Many vessels that discharge ballast water in the U.S. are not implementing the voluntary ballast water management guidelines, based upon their reports. However, we cannot estimate accurately the full extent of non-compliance with ballast management guidelines due the very low rate of reporting by foreign arrivals to the U.S.

### **RECOMMENDATIONS**

32. There exist currently numerous impediments preventing accurate measurement of the patterns of ballast water delivery and management in the U.S. Each of these should be the focus of specific action(s) by the U.S. Coast Guard to improve the current national assessment. Only with accurate estimates for ballast water discharge and management patterns can the U.S. Coast Guard (a) assess the effectiveness of regulations in changing ballast water management and (b) identify geographic areas, vessel traffic, or industry sectors for enhanced efforts, including education, to prevent introductions via ballast water.
33. **Of paramount importance, reporting must be improved to characterize the ballast water management of all vessels arriving to the U.S. ports.** This can be accomplished by one of two methods: (a) complete compliance with mandatory reporting by all vessel arrivals or (b) complete reporting by a representative sample of all vessels that results from a carefully designed stratified, random sampling program. The former approach is preferable, as it would yield the highest quality and quantity of data.
34. **The ballast water reporting requirement should be extended to include coastwise ship traffic, and ships should report ballast water management activities for all ports visited.** We believe there remains confusion about which vessels should report, and when they should report on ballast water management. Comprehensive (foreign and coastwise) reporting would remove any uncertainty about which traffic should report, improve overall data quality, and address important gaps in the current program:
  - Many ships enter the U.S. from outside of the EEZ and move coastwise. Although such traffic is meant to report the fate of any ballast water discharged in U.S. waters after entry, under the current reporting requirement, we believe many ships report discharge only for the first port of entry.
  - The transfer of coastal water itself is an important issue, resulting in discharge of large volumes at many ports (e.g., Valdez, Alaska and Chesapeake Bay), and can lead to unwanted biological invasions. Inadequate data exist currently about management and delivery of ballast water that originates within the U.S. (e.g., San Francisco Bay to Chesapeake Bay, Chesapeake Bay to New Orleans) upon which to make management and policy decisions.
  - The use of NOBOB (i.e., relatively empty) tanks for ballast operations upon arrival to the U.S. can result in the discharge of residual organisms from foreign sources that could result in new invasions. The use and management of these tanks, comprising 38.9% of all ballast tanks for reporting ships, is not addressed in the current program. However, reporting at each port (with the current form) would measure the extent, pattern, and potential importance of this practice.
35. **Additional information is required from each ship to better measure ballast water management.** Specifically, the capacity of each ballast tank is needed for the Clearinghouse to calculate directly the percent ballast water exchange, which is erroneous (and therefore unusable) on many ships' reports. In addition, instructions for the reporting form could be improved to illustrate how to prevent common errors associated with reporting of data for ballast water volume and exchange.

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- There remains a need for implementation of Verification Surveys, which are designed specifically to verify the accuracy of reporting by vessels.** Verification Surveys should be implemented, using a stratified, random sampling design across the entire country or at selected key ports. This approach is necessary to address accuracy for different geographic regions and vessel types over time.
37. **Fully implement use of the revised U.S. Coast Guard vessel tracking system (MSIS), to create a comprehensive database of key information for all vessel arrivals to each port.** The previous version of MSIS did not include standardized information on last port of call, restricting its utility for analyses by the Clearinghouse, and MARAD's data had significant gaps in some regions.
38. **To the maximum extent possible, encourage electronic submission of ballast water reporting by vessels.** This would serve to increase accuracy of data and reduce the time needed to make resulting data available. Further, electronic submission would reduce the effort required by the shipping industry.

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### INTRODUCTION

Biological invasions are fundamentally changing the structure and function of the earth's ecosystems. Invasions result from the transfer and establishment of species outside of their historical range. The extent of invasions has become increasingly clear over the past decade, and many communities are now dominated by invading or nonindigenous species (NIS) in terms of number of organisms, biomass, and ecological processes. At the present time, it is clear that invasions have caused dramatic shifts in food webs, chemical cycling, disease outbreaks, and extinction rates.

There is now great public concern about invasions, driven in large part by observed ecological effects as well as economic impacts, such as crop and fishery losses, associated with invasions. For example, recent estimates suggest the economic impacts of NIS in the U.S. alone exceed \$100 billion per year. Although the impacts of most invasions remain unexplored, there is no doubt that biological invasions have become a major force of ecological change, as well as economic and human health impacts, operating on a global scale.

Recent studies suggest that invasion rates are continuing to increase. For example, the rate of known marine invasions in North America has increased exponentially over the past two hundred years. Furthermore, this pattern appears very robust across various habitats, taxonomic groups, and global regions. This apparent increase in invasion rate, combined with significant impacts, has further elevated public and scientific concerns about invasions in recent years.

In response to the increasing number of invasions, management strategies and policies are being advanced at state, regional, national and international levels. For example, the U.S. Congress has enacted two laws since 1990, and President Clinton signed an Executive Order, to limit the rate and impact of invasions. The Convention on Biological Diversity recognizes biological invasions as a significant threat to biological diversity and is exploring approaches to reduce this threat. Furthermore, many state and local policies are being implemented within the U.S. and elsewhere. Much of this response has focused on steps to prevent future invasions, with some additional effort focused on control and management of established invasions.

In coastal marine ecosystems, commercial shipping is considered to be the largest single transfer mechanism, or vector, for NIS. Historically, species have been transferred unintentionally on the hulls and in ballast of ships, resulting in hundreds to thousands of invasions worldwide. Today, ballast water of ships appears to be the leading source of invasions for coastal habitats in the U.S. and elsewhere. Ballast water is clean water taken on in one port, used for stability and trim during voyages, and discharged to various extents at future ports of call. In 1991, the U.S. alone received >70 million metric tons of ballast water from foreign ports. The use of ballast water by ships results unintentionally in the entrainment and dispersal of species around the globe.

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To reduce the risk of invasions associated with ballast water, vessel masters are being asked to manage their ships' ballast water, using practices that prevent the transport of organisms. The International Maritime Organization (IMO) has issued voluntary guidelines, including the use of open-ocean ballast water exchange, to limit transfer of coastal organisms in ballast water. In essence, ships are asked to flush out their ballast tanks at sea, reducing the concentration of coastal organisms, which have the greatest chance of becoming established at future ports of call. Many member countries have requested or required ships to comply with these guidelines. In addition, alternative treatment methods are at various stages of development and testing throughout the world.

The U.S. Congress has passed two laws that include guidelines and regulations for management of ships' ballast water. Here, we report on the status and trends of ballast water management, as directed by the most recent of these laws.

### **National Ballast Information Clearinghouse**

The National Invasive Species Act of 1996 (NISA) directed the United States Coast Guard (USCG) in conjunction with the Smithsonian Environmental Research Center (SERC) to develop a National Ballast Information Clearinghouse (hereafter Clearinghouse). The Clearinghouse, located at SERC, plays a central role in the organization and analysis of national data concerning the transfer and invasion of nonindigenous species associated with the ballast water of ships.

Under NISA, Congress directed the Secretary of Transportation to promulgate regulations that (a) require vessel masters to report their ballast management practices when entering U. S. waters from beyond the 200 mile Exclusive Economic Zone (EEZ), and (b) describe a suite of voluntary ballast water management practices for use by such vessels. The voluntary guidelines include holding ballast water on board and open-ocean exchange (flushing) of ballast tanks that will be discharged in U.S. waters. The management practices are intended both to minimize the transfer of NIS in ballast water of ships and to reduce the risk of exotic species invasions associated with the release of ballast water.

A key element of NISA involves tracking the effectiveness of voluntary guidelines, as measured by (a) the level of compliance with voluntary guidelines, (b) changes in the rate and patterns of ballast water delivery, and (c) reduction in the rate of ballast-mediated invasions. The Clearinghouse was created to provide these analyses on a national scale.

### National Ballast Survey

The Clearinghouse and the USCG have implemented the National Ballast Survey (NABS), to measure ballast water management and delivery patterns for commercial vessels that arrive to U.S. ports from outside the nation's EEZ.

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The NABS was designed explicitly to create a national database on ballast water to be used to measure: (1) rates of compliance with the ballast water reporting requirement; (2) rates of compliance with the voluntary management guidelines for holding or exchanging ballast water; (3) patterns of ballast water delivery and management (including exchange) according to vessel class for geographic region and season of arrival; (4) among-year changes in ballast water management by vessel class and geographic region; and (5) accuracy of data through use of multiple, independent data sources.

The NABS relies on three primary sources of data. These include:

1. Ballast water information reported directly to the Clearinghouse by arriving vessels;
2. Foreign waterborne Transportation statistics collected by the U.S. Customs Service and the U.S. Army Corps of Engineers. The Department of Transportation's Maritime Administration (MARAD) compiles these data on vessel arrivals to U.S. ports. For selected port systems where MARAD data were incomplete, Maritime Exchange data were required.
3. Verification surveys of vessels, arriving from outside the EEZ, conducted nationwide by the USCG.

Each of the data sets serves a specific and important function in the NABS. Use of these data can be viewed as a step-wise process:

- The ship-generated reports (data source 1, above) were intended to create a large, comprehensive data set that includes ballast water history for most vessels arriving to each U.S. port from outside of the EEZ.
- The MARAD data of arrivals at each port can identify all vessels, arriving from outside the EEZ, that are missing in the first data set, providing a measure of under-reporting and thus of compliance with NISA's mandatory reporting requirement.
- The Verification Survey is meant to provide "ground-truthing" for a subset of all arrivals to (1) estimate the accuracy of the first data set and (2) make statistical comparisons of ballast delivery patterns by vessel class, geographic region, and size.

Figure 1 summarizes the functional aspects of the National Ballast Survey. Data are submitted to the Clearinghouse from the multiple sources and entered into a relational database. The database is then queried, and the results are used to describe ship arrival and ballast water management patterns. Every two years, a biennial report of these patterns is to be submitted to the U.S. Coast Guard and Secretary of Transportation, and is used inform the U.S. Congress on implementation of NISA.

### Other Clearinghouse Components: Marine Invasions Database and Research Directory

The NABS is only one component of the Clearinghouse. The Clearinghouse functions more generally as a centralized source of national information on marine invasions and on ballast water invasions issues. The following areas are being actively pursued.

- *The National Ballast Survey (NABS)* - Measurement of spatial and temporal patterns of ballast delivery / management for the U.S.;

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- *The National Marine and Estuarine Invasions Database* - Measurement of patterns and rates of coastal marine invasions for the U.S.;
- *Regional databases on invasion ecology* – Characterization of patterns and rates of invasion for selected bays and estuaries (e.g., Chesapeake Bay, San Francisco Bay, Puget Sound, Tampa Bay, Prince William Sound, Coos Bay, etc.).
- *The Aquatic Invasions Research Directory* - Creation of an internet-based, searchable database containing regularly updated international information on people, research, technology, policy, and management issues relevant to ballast water and aquatic invasions.
- *The Ballast Water Exchange Verification Project* Testing and development of *in-situ* and laboratory-based technologies for improved verification of ballast water exchange.

### **Purpose of Biennial Report**

The overall goal of this report is to assess (a) compliance with the ballast water reporting requirement and (b) implementation of voluntary guidelines for ballast water management for the first two-year reporting period of NABS (1 July 1999 – 30 June 2001). The biennial report is meant to inform the U.S. Coast Guard, the Secretary of Transportation, and the U.S. Congress of the current status and trends for nationwide ballast water management and delivery. In addition, the report also provides conclusions about the overall implementation of the national program and recommendations to address critical gaps that currently exist.

### **APPROACH: ASSESSING COMPLIANCE**

#### **Compliance with Ballast Water Reporting**

Compliance with the reporting requirement, and compliance with the voluntary guidelines, were assessed at three different geographic scales: national, regional (major coasts), and local port system (U.S. Coast Guard Captain of the Port Zone, COTPZ; Figure 2). Prior to all analyses, data received by the Clearinghouse underwent standard protocols to detect and remove erroneous records, including duplicate reports and numerical outliers beyond the realm of possibility. Further information on these procedures is available upon request.

Figure 3 defines which traffic patterns were included in the present analyses by NABS, illustrating (a) the variety of different shipping routes a vessel might follow before arriving at a U.S. or Canadian port and (b) which ones were included when estimating compliance with mandatory reporting requirements, as outlined in NISA. The following rules were applied to differentiate “foreign” arrivals (those included in the analyses) from “domestic” or “coastwise” arrivals (those excluded), under direction by the U.S. Coast Guard:

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- (1) All arrivals to the Pacific coast, Atlantic coast or Gulf of Mexico coast from countries other than the United States or Canada are designated as “foreign” arrivals.
- (2) Arrivals to or from U.S. island states or protectorates (e.g., Hawaii, Guam, and Puerto Rico) to or from any of the three mainland coasts are considered “foreign” arrivals since they depart the EEZ during transit.
- (3) Vessels that leave the Pacific coast of North America, traverse the Panama Canal, and arrive at the Atlantic or Gulf of Mexico coasts (and vice versa) are deemed “foreign” arrivals.
- (4) Since there are no available records to verify whether a coast-wise transit leaves the EEZ, all within coast transits, as well as those between the Atlantic and Gulf coasts were categorized as “domestic” arrivals.
- (5) For inter-island passage, only vessels that transited from a foreign country’s island to a U.S. state or protectorate were considered “foreign” arrivals.
- (6) Arrivals to the Great Lakes are excluded from the present analysis. These vessels are required to undertake ballast water exchange, and a separate program of the U.S. Coast Guard evaluates compliance for these vessels.

The analysis of compliance with reporting requires knowledge of actual arrivals, allowing the detection of non-reporting ships. For this analysis, we relied upon arrivals data from the Maritime Administration. To validate use of these data, we compared their quality to that of other sources of arrival information. Below, we present briefly the results of this comparison, providing a strong rationale for use of the Maritime Administration data.

### Sources of Data on Vessel Arrivals

The Department of Transportation’s Maritime Administration (MARAD) compiles vessel arrival data that are collected by the U. S. Customs Service and the U. S. Army Corps of Engineers. To evaluate the completeness and utility of MARAD’s vessel arrival information, comparisons were made with two other databases 1) USCG Port State Control data from Advance Notice of Arrivals submitted to the COTPZs (creating the USCG or MSIS database) and 2) Maritime Exchange data from selected port systems (Baltimore, Boston, and San Francisco).

### Comparison Between USCG and MARAD Databases

For 1998, the total number of vessel arrival reports recorded by the USCG was 85,319. Removal of all records listed as “Not Arrived-No Action Scheduled” reduced the number to 64,129 arrivals for the entire United States. For the same year, MARAD reported 92,379 total vessel arrivals. Removal from the MARAD data of vessels smaller than 300 gross tons, to reflect the same vessel sizes as targeted by the USCG, resulted in a total of 71,226 arrivals. The overall agreement between the two data sets (64,129 vs. 71,226) is good, with a difference of just 10%.

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The MARAD data set includes standardized identification of “Last Port of Call” and “Arrival Port”, data that are essential for tracking shipping patterns for the purposes of the NABS, but which are not consistently entered in the USCG database. The MARAD database thus divides vessel traffic into “Foreign” and “Domestic” arrivals, while there is no easy and reliable way to distinguish foreign from domestic arrivals using the USCG database. With the exception of mainland to island and island to mainland transits, all U.S. to Canada and Canada to U.S. arrivals outside the Great Lakes were designated as “domestic” arrivals in accordance with rules applied to ballast water reports as described in Introduction.

### Comparison of MARAD and Maritime Exchange Data

To further test the completeness of the MARAD database, MARAD data were compared with data compiled by the independent Maritime Exchanges of Baltimore, Boston, and San Francisco (Table 1). In general, the agreement between the MARAD and Maritime Exchange estimates of the number of vessels arriving from foreign ports was quite good. For the Port of Baltimore, the data for 1997 and 1998 show nearly identical results. In the comparison with Maritime Exchange data for Boston and San Francisco between 1995 and 1997, MARAD reported somewhat higher numbers of foreign arrivals.

According to MARAD, vessel arrival data have become increasingly more accurate since 1997 (e.g., many fewer “unknown” entries for the ship type data field). The average number of MARAD reports deviated from Maritime Exchange data across all three ports by less than 9.6%. It is not clear how the quality of reporting varies between individual Maritime Exchange offices.

### Selection of MARAD Data as the Baseline for Determining Reporting Compliance

The close agreement between the Maritime Exchange and MARAD data for foreign arrivals indicates that the MARAD “foreign arrival” designation is probably a close approximation of the vessel traffic that actually arrives from outside the EEZ. Moreover, the minor differences in total vessel arrivals reported by MARAD and the USCG further suggest that MARAD provides a good overall estimate of total ship arrivals to the U. S. When the extent of reporting, information content, and ease of accessibility were compared for MARAD, USCG, and Maritime Exchange databases, the MARAD database was deemed the most serviceable for use in the National Ballast Survey.

### Constraints with MARAD Data and Adjustments

Although MARAD data were generally very good throughout the country, they were not available for a limited number of ports or limited time periods. This was especially problematic for Alaska, Hawaii, and Guam. To preclude over-estimation of reporting rates, the corresponding ballast water reporting forms were excluded from regional and national estimates of reporting compliance for particular months for Alaska and Hawaii

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(so indicated in figures), and compliance with reporting simply could not be estimated for Guam during this period.

For a few other ports, we were able to obtain arrivals data that were missing from MARAD through Maritime Exchanges. Specifically, we obtained arrivals for two months each in Los Angeles and New York from the local sources. In addition, we obtained and used data from local sources to correct inconsistencies (i.e., missing data) within the MARAD data for San Francisco Bay. (Note: While the Maritime Exchanges can provide very useful and high quality data, it is important to recognize that their geographic scope is often limited to a particular port system, and many regions of the country simply do not have these or other local entities that comprehensively track vessel arrivals.)

### **Compliance with Voluntary Exchange Guidelines**

Although some gaps in the MARAD data limited use of all data in measuring compliance with mandatory reporting, all submitted ballast water reporting forms were used to determine the extent to which voluntary ballast water management guidelines were followed.

## RESULTS

### **Compliance with Ballast Water Reporting Requirement**

#### *1. Nationwide Vessel Traffic.*

The extent of vessel traffic to the U.S. as measured by the cumulative number of foreign MARAD arrivals, varied considerably among coastal regions (Fig. 4). The East Coast and Gulf Coast led the nation in foreign arrivals, accounting for 38% and 30% (respectively) of the 95,471 arrivals from 1 July 1999 to 30 June 2001. The West Coast represented only 14% of total arrivals, the Caribbean accounted for 16% of arrivals, whereas Alaska and Hawaii combined received only 2% of the traffic.

#### *2. Nationwide Compliance.*

The nationwide compliance with required ballast water reporting was 30.4% for the period 1 July 1999 to 30 June 2001 (Table 2). The Clearinghouse received 13,266 reports during year 1 and 15,722 during year 2, representing 28.3% and 32.4% compliance (respectively). Thus, less than 1/3 of all vessels required to report ballast water management information upon entry to the United States met this requirement, and there was relatively little improvement between years. When examined on a monthly basis (Figure 5), nationwide reporting rates also show a very slow increase in reporting compliance over the 24 months, occurring mostly in January 2000 (as discussed below).

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### *3. Regional Compliance.*

Among the major mainland coasts, the West Coast (made up of California, Oregon, and Washington) had the highest regional compliance with the reporting requirement for the two-year period: 66.5% of arrivals submitted reports (Figure 6a, Table 2). In contrast, compliance with reporting was only 29.0% for the East Coast and 17.1% for the Gulf Coast during the same period. Hawaii, Alaska, and the Caribbean had 50.4%, 20.8%, 16.6% compliance respectively (Fig. 6b, Table 2).

The rate of compliance for each coast increased from year 1 to year 2 (Fig. 6a,b; Table 2), except for the Caribbean, which experienced decreased compliance (-3.7%). The West Coast had the greatest net increase (15.3%). The net increases for the remaining coastal regions were: Alaska (14.9%), Hawaii (7.9%), East Coast (5.2%), and the Gulf Coast (0.5%).

Monthly reporting rates for each coast also reflected the same patterns over time, showing the greatest improvement for the West Coast (Figs. 6a,b). To better characterize changes in reporting over time, we used linear regressions to measure the rate of change in reporting for the three major coasts, allowing us to estimate the number of years required for each coast to reach 100% compliance. The projected time periods necessary for complete compliance by mainland coasts were: 3.3 years on the West Coast ( $y=1.27x+50.7$ ,  $r^2=0.56$ ), 14.8 years on the East Coast ( $y=0.43x+23.6$ ,  $r^2=0.79$ ), and 58.3 years on the Gulf Coast ( $y=0.12x+15.6$ ,  $r^2=0.18$ ).

Although the overall performance for the West Coast, and the projected time to complete reporting is encouraging, this represents only a small amount (14%) of the total nationwide traffic. Most arrivals occur on the East and Gulf Coasts, for which reporting compliance lagged behind the West Coast and show only slight improvement over the past 24 months.

### *4. COTPZ Compliance*

As with the nation and most regions, compliance with the reporting requirement was highly variable among COTPZs (Table 2). Reporting for COTPZs ranged from 10.1% to 87.9%, equaling or exceeding 50% in only 6 cases: San Francisco, Los Angeles, Seattle, Portland (OR), Honolulu, and Valdez. The relative high reporting and compliance rates for San Francisco and Los Angeles COTPZs may result from state law requiring ballast water reporting and authorizing penalties for noncompliance, effective as of 1 January 2000. It is noteworthy that compliance with reporting was relatively high (38-46%) in California at the start of NABS, compared to the other western states. This may have resulted from increased attention and the passage in October 1999 of a state law with the pending threat of penalty; furthermore, compliance increased markedly in January, when the law went into effect and penalties were possible for failure to report.

The high compliance of the Seattle COTPZ zone (64.5%) and Portland COTPZ (50.3%) may also result from state legislative activity. Washington State passed a law

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concerning ballast water that went into effect in 2001, and Oregon just recently passed a similar measure. In addition, relatively high compliance in Valdez (50.0%) may be associated with a targeted federal law requiring ballast water exchange for oil tankers in that port, as the number of arrivals recorded by MARAD was low and tankers comprised a relatively large fraction of the total for this period. However, MARAD reporting in Alaska was incomplete in the first three months of 2001, possibly influencing the compliance rates measured there.

Interestingly, compliance remains low in Maryland (34.8% in year 2), which passed a similar state law, but has not yet begun to impose penalties for failure to report. It will be instructive to examine compliance over time for states that implement state ballast water laws, particularly during the time periods surrounding the initiation of penalties for failure to report.

### **Compliance with Voluntary Exchange Guidelines**

Under 33 CFR §151.2045, vessel masters were required to report specific information for discharged ballast water originating outside of the EEZ, including (a) whether or not ballast water was exchanged or otherwise treated, and (b) specific details of ballast water management on a per-tank basis, providing the volume, exchange method, and calculated percent of water exchanged. There are thus two possible measures for the rate of implementation of the voluntary guidelines for ballast water management operations. First, implementation of guidelines can be evaluated as the proportion of arriving vessels reporting exchange of all water discharged, or compliance on a *per capita* (ship) basis. Since the guidelines include retention of unexchanged or untreated ballast water, vessels that hold ballast water on board are considered to be in compliance with the voluntary guidelines. Second, implementation can be evaluated as the proportion of discharged ballast water by volume (across all ships) reported to have been exchanged, or the overall effect on the discharge of treated versus untreated ballast water (across the aggregate of reporting vessels).

The voluntary guidelines (33 CFR §151.2035(b)) request that vessel masters carrying ballast water into the waters of the U. S. after operating beyond the EEZ employ at least one of a suite of ballast water management practices. These include exchanging ballast water in areas at least 200 miles from any shore and at least 2,000 meters deep, or in an alternative ballast exchange zone approved by the COPTZ; retaining ballast water on board; using an alternative environmentally sound, USCG approved method of treatment; or discharging ballast water to an approved reception facility. Exchange, under 33 CFR §151.2025, includes flow-through exchange, in which three full volumes of open-ocean water are pumped through a ballast tank, and empty-refill exchange, in which a ballast tank is emptied completely and then refilled with mid-ocean water. Thus, for exchanged ballast water, full compliance with these voluntary guidelines includes water that has been exchanged 100% (one full tank volume) by empty-refill or 300% (three full tank volumes) by flow-through methods, or otherwise treated, or retained on board.

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Although the Clearinghouse database was designed explicitly to measure percent exchange and exchange method for each tank (per vessel), examination of the ballast water management reports submitted by vessels revealed many errors in the ships' reports. It appears that widespread confusion existed among ships crews regarding how to determine and report the percent of water exchanged. Furthermore, many reports did not indicate (as requested) whether the performed exchange was empty-refill or flow-through. Consequently, it was often not possible to determine whether a reported complete exchange was accomplished by pumping one or three full volumes of open-ocean water through a tank, or the method of exchange employed. Therefore, for discharging vessels, the extent of exchange was categorized as "Discharge with No Exchange", "Discharge with Some Exchange" and "Discharge with Unknown Exchange" (see below for further discussion of limitations to precise calculation and reporting of percent exchange).

**Caution:** Ideally, with a high level of reporting, the ballast water management reports submitted by vessels could be used to estimate the amount of treated and untreated (exchanged or otherwise) water discharged in the U. S. However, compliance with the reporting requirement was so low, only 30.4%, that reporting vessels cannot be considered representative of the larger population of all arriving ships entering U. S. waters.

### Compliance with Voluntary Guidelines by Ship

#### *1. National Compliance*

Most (73.6%) of the reporting vessels indicated no intention to discharge ballast water (Tables 3a,b). Of the 28,988 vessels filing reports, only 7,652, or 26.4%, declared discharge of foreign ballast water within U. S. territory: 12.9% declared that no exchange had been conducted, while 13.0% of the reporting vessels declared some exchange (and the residual did not specify). Therefore, of the vessels that reported, 86.6% indicated they had followed the voluntary guidelines, either through retaining ballast water on board or by exchanging ballast water prior to discharge.

Although most reporting vessels did not discharge ballast water, it is noteworthy that of the 7,652 vessels that did report an intention to discharge, only about one half of these vessels reported some mid-ocean exchange prior to ballast water discharge. This pattern remained relatively constant throughout the 2 year of reporting (Fig. 7).

#### *2. Regional Compliance*

By region, the percent of reporting vessels that declared no discharge varied from 90.6% in Hawaii (89.7% for the Pacific Islands if Guam is included) to 21.0% in Alaska (Tables 3a,b).

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The West Coast reported the highest proportion of discharging vessels that underwent some exchange (73.9%) and the Caribbean reported the lowest proportion (20.3%), whereas the East and Gulf Coasts were intermediate (26.5% and 49.9% respectively; Fig. 8).

### *3. COTPZ Compliance*

At the Captain of the Port Zone level, Los Angeles received the greatest percentage of the nation's ballast water reporting forms (6,099 forms, 21.0% of total) between 1 July 1999 and 30 June 2001. Miami received 3,878 forms (13.4%), and San Juan, Puerto Rico received 1,896 forms (6.5%). In Los Angeles 1,454 vessels reported discharge, of which 36.6% had no mid-ocean exchange and 61.6% had some exchange prior to discharge. This pattern was reversed in Miami (1,533 discharging vessels, 84.3% with no exchange, 15.1% with some exchange) and San Juan (433 discharging vessels, 79.4% with no exchange, 20.3% with some exchange) (Tables 3a, 3b). These results indicate very different ballast management practices and discharge patterns among the COTPZs that receive the greatest number of foreign arrivals.

### Compliance Based on Percent Exchange by Volume

While the preceding approach provides an assessment of compliance on the basis of individual ships, from a biological perspective an important compliance measure is the proportion of discharged water that was exchanged. The ballast water reports submitted by vessels identify, on a per tank basis, the percent exchange accomplished for each tank discharged. However, it is clear from the ballast water reporting forms submitted that there is widespread confusion on how percent exchange is calculated and reported, despite detailed published instructions. Additionally, the current ballast water reporting form does not require that the capacity of all discharged ballast tanks be specified, precluding a crosscheck of reported percent exchange values. These constraints limited the resolution at which ballast water exchange could be analyzed and necessitated that ballast water exchange be categorized as "Discharge with No Exchange", "Discharge with Some Exchange", or "Discharge with Unknown Exchange".

#### *1. Nationwide Compliance*

Approximately 37.3 million metric tons (mt) of discharged ballast water was reported nationally (Table 4). Of this total, 25.6 million mt (68.7%) was reported to have undergone exchange, and 11.1 million mt (29.7 %) was reported as unexchanged (Table 4). Reported ballast water management practices and discharge patterns were relatively constant during the first 24 months of the mandatory reporting period (Fig. 9).

#### *2. Regional Compliance*

As with exchange practices on a per ship basis, the percent of the discharged volume that had undergone some exchange varied across the major regions (Fig. 10, Table 4). By

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volume, the region with the highest proportion of discharged volume that underwent some degree of exchange was the West Coast. The lowest volumetric proportion of discharge that underwent some exchange was in Alaska (Fig. 10).

### *3. COTPZ Compliance*

There were four COTPZs that reported discharging greater than 1 million mt tons of non-exchanged water: Anchorage (1.89 million mt), Los Angeles (1.33 million mt), Houston (1.19 million mt), and Miami (1.05 million mt). This non-exchanged ballast water discharge made up the majority of all discharge in Miami (88.4%), Anchorage (79.3%), and Houston (50.6%) (Table 4). Conversely, seven COTPZs discharged more than 1 million mt of ballast water that had undergone some degree of exchange. These COTPZs were: Portland, Oregon (5.62 million mt, 91.5% of discharge), Los Angeles (4.71 million mt, 76.9% of discharge), New Orleans (3.15 million mt, 77.7% of discharge), Seattle (2.59 million mt, 89.1% of discharge), San Francisco (1.81 million mt, 85.8% of discharge), Hampton Roads, Virginia (1.34 million mt, 76.7% of discharge), and Houston (1.10 million mt, 46.9% of discharge). Juneau, Alaska, and Wilmington, North Carolina had the highest percentages of discharged ballast water reported to have undergone some exchange (110,873 mt, 98.1% of discharge and 294,633 mt, 92.2% of the discharge, respectively). Conversely, over 90% of the ballast water discharged into Portland, Maine and Jacksonville had not undergone any exchange at all.

### Reasons for Not Conducting a Mid-Ocean Exchange

If a ballast water exchange was not performed prior to discharge, ships' masters were asked to provide the reason(s), on the ballast water reporting form. The open-ended nature of the question resulted in a large number of unique responses, complicating an analysis of the reasons for not exchanging ballast water. However, pooling the responses by loose categories (Table 5) suggests that an overt concern for the safety of the vessel and crew was not the over-riding reason for the low rate of ballast water exchange. Of the 1,208 vessels that reported discharging ballast water without exchanging, only 56 vessels or 4.6% of the vessels cited "safety", or some variant of the term or phrase as a reason for not conducting an exchange. A frequent reason cited for not conducting ballast water exchange was that the ship's itinerary precluded such an operation. In many such cases, there may have been an insufficient period of time during the voyage to conduct a complete exchange, either because the voyage was too short to permit an exchange, or the ship's route did not include areas 200 miles from shore and 2,000 meters deep.

### **Geographic distribution of ballast water exchange**

Vessel masters are required to report the latitude and longitude for the end points of ballast exchange operations. These data were used with geographic information system software to construct a map showing the spatial distribution and density of exchange operations on a global scale (Fig. 11). Bathymetric data describing ocean depths of less

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than 2,000 meters were overlaid with ocean areas that were equal to or less than 200 nautical miles from land, creating a map of locations restricted by the mid-ocean exchange guidelines in NISA. The end-points of reported tank exchanges were then plotted on the map. The central regions of the Pacific and Atlantic oceans are clearly the sites of much of the exchanged ballast water discharged to U. S. waters, as requested in the voluntary guidelines. However, many points lie within the shaded, or restricted, areas, indicating that a portion of the ostensibly “exchanged” water that is discharged into the U. S. comes from locations in proximity to coasts. Perhaps the clearest examples of this can be seen in the Gulf of Mexico and along the Pacific coast of Mexico and Central America. Some of the incidences of exchanging ballast close to foreign coastlines may stem from a misunderstanding among ship’s masters that the guidelines request that water be exchanged 200 miles or more from any coast, not just from the U. S. coast. The shipping routes to the Gulf of Mexico from Mexico, Central America, the Caribbean, and portions of South America are likely highly constrained with respect to where mid-ocean exchange can take place, as few locations may meet the specified distance and depth criteria for exchange.

### **Verification Surveys**

The U.S. Coast Guard implemented a pilot program for Verification Surveys. The survey was designed to randomly target vessel arrivals for boarding, based upon COPTZ, covering the entire coastal U.S. For each of 30 COTPZ, the target was set at 24 boardings per year for each of five ship types (Bulk Carrier, Container, General Cargo, Tanker, and Other). Thus, if all boardings were conducted, this would provide a ground-truthing for 3,600 arrivals each year.

The results of the pilot program are currently being evaluated to consider the best strategies available to verify accuracy of reporting. Although the Verification Surveys likely provided an important outreach and training activity by U.S. Coast Guard, the actual number of boardings by USCG was variable in space and time, and sometimes fell short of the anticipated goal. The shortfall resulted from both an uneven distribution of vessel arrivals (spatially and temporally) and, in some cases, conflicting demands upon USCG personnel.

### **Non-discharged Ballast Tanks: Fate and Potential Importance?**

Approximately 70% of vessels that reported on ballast water management indicated no intent to discharge ballast water (Tables 3a, 3b). However, most of these vessels carried ballast water upon arrival: 87.2% of all reporting arrivals carried ballast water, and only 12.8% indicated “No Ballast on Board” (NOBOB; Table 6). The fate of this ballast water remains unknown.

Ships are required to report the fate of all ballast water to be discharged in the U.S. that originates from outside the EEZ (i.e., foreign ballast water). Nearly all reporting ships submit their report at the port of first entry. At this time, ships are to indicate the

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discharge of all foreign ballast water at the first port of entry, as well as all future ports, in the U.S. Should the actual pattern of discharge change from the projected plan, ships are required to submit an amended report to the Clearinghouse.

Many ships visit multiple U.S. ports after arrival from outside the EEZ, becoming coastwise traffic. In fact, nearly half (45.7%) of the 28,992 arrivals that reported ballast water management visited multiple U.S. ports upon arrival. However, ships rarely reported ballast water discharge to the Clearinghouse beyond the initial port of entry and amended forms were also rare. Although this may accurately represent ballast water discharge for these vessels, it may also result from confusion about the reporting requirement and underestimate actual ballast water discharge.

A related issue arises when considering empty ballast tanks that are used for ballast operations, including discharge, within the U.S. Although 12.8% of vessels are reported as NOBOB, 38.9% of all ballast tanks for reporting vessels were in NOBOB condition (Table 6). For vessels that reported at least one NOBOB tank, the average number of tanks/ship with and without ballast water were no different: 8.5 and 8.6, respectively (Table 7).

Although there are currently no guidelines in effect for ballast water management associated with NOBOB tanks, recent concerns have surfaced in the Great Lakes that use of NOBOB tanks after entry into U.S. waters may pose significant risks of introducing NIS. Specifically, although NOBOB tanks are relatively empty, they may still contain residual organisms that can be re-suspended and discharged by ballast operations. The extent to which vessels arriving to the U.S. from overseas use NOBOB tanks in subsequent ballast operations, either during coastwise movements or within the port of arrival, remains unknown.

## CONCLUSIONS

### **Ballast Water Reporting**

Nationwide compliance in reporting ballast water management by commercial ships was low and showed little improvement over the first 2-year period of mandatory reporting. For June 2001, the last month of the two-year period, the nationwide compliance with reporting was low, only 34.7% of arrivals subject to the reporting requirement.

Although compliance did improve markedly along the West Coast (composed of California, Oregon, and Washington) over the past 24 months, coinciding with initiation of state regulations, this represents only a small proportion (14%) of the nationwide vessel arrivals subject to reporting. In contrast, compliance in reporting for the East Coast and Gulf Coast, which together account for 68% of vessel arrivals required to report, showed little change during the same time period. Thus, at the present rate of improvement in reporting, full compliance will not occur for many decades.

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There remain some significant gaps in the MARAD data for Hawaii, Alaska, and Guam, making it difficult to accurately assess compliance with reporting for these locations. Although this has little impact on the overall pattern for the country, as these coasts account for only a small fraction (2%) of the cumulative vessel arrivals, it does limit assessment of compliance for these regions at the present time.

### **Ballast Water Management**

Despite our summary of existing reports, it is currently not possible to assess ballast water delivery and management patterns for the U.S., because the rate of under-reporting is so severe: Most (69.6%) of vessel arrivals required to report simply failed to do so. Thus, the ballast management of most ships remains unknown, and it cannot be assumed the 30.4% of arrivals that do report are in any way representative of the entire population. Of ships that did report, most (>70%) reported no discharge of ballast water and were therefore following the voluntary guidelines. Of those that reported discharge, approximately half of the vessels indicated no exchange had occurred prior to discharge.

Analysis of the geographic locations of the ballast exchange endpoints as recorded by the reporting vessels indicated that an appreciable proportion of the exchanges had occurred within 200 miles of coastlines. This may be due to misunderstanding on the part of vessel masters that exchange is requested to occur at least 200 miles away from any coast, not just the U. S. coast.

### **General**

Overall, the low level of reporting remains a significant problem for (a) interpreting compliance with voluntary guidelines and (b) tracking the ballast water delivery and management patterns for the country. Reporting by ships must increase dramatically to meet these objectives. However, there exist some additional factors, which prevent the current program from achieving its goals, including:

- Ballast water reporting requirements currently exclude a large component of vessel traffic in the U.S. and (even if compliance improves) therefore provides an incomplete picture;
- No Verification Surveys are currently in effect to verify the accuracy of reporting;
- Ballast water reports submitted by the ships often contained errors in the estimation of ballast water exchange;
- Tracking of vessel arrivals by MARAD and the U.S. Coast Guard still has some significant gaps;
- Use of electronic data submission by ships remains low.

Each of these elements should be the focus of specific action by the U.S. Coast Guard to improve the current program, allowing it to meet the objectives outlined in NISA. Below, we provide recommendations for action in each area.

## RECOMMENDATIONS

### **1. Improve Ballast Water Reporting by Ships to Provide Representative Data.**

A significant problem remains in acquiring the data necessary to measure ballast water delivery and management patterns for the country. In the present program, this exists as a severe lack of reporting by most vessels expected to submit information.

To address this problem, the U.S. Coast Guard has two possible avenues. First, the U.S. Coast Guard could take steps to maximize compliance with mandatory reporting by all vessels subject to the requirement. Alternatively, the U.S. Coast Guard could require or obtain complete reporting on a representative subset of vessels.

The former approach is most preferable, as it would result in the highest quality and quantity of data. In contrast, the latter involves a representative sampling of vessels and would require a stratified, random subsample of all vessels by vessel class, geographic location, and time (season and year). Although this second approach is theoretically feasible, it may require a large sample size, given the relatively large amount of variation in ballast water management that we expect among vessels, locations, and seasons.

### **2. Extend the Ballast Water Reporting Requirement to include (a) Coastwise Traffic and (b) Better Reporting for each Port of Arrival.**

For a variety of reasons, the current reporting requirement misses a significant amount of vessel traffic and ballast water delivery.

- Many ships enter the U.S. from outside of the EEZ and move coastwise. Although such traffic is meant to report the fate of any ballast water discharged in U.S. waters after entry, under the current reporting requirement, we believe many ships report discharge only for the first port of entry.
- The transfer of ballast water from coastal (i.e., domestic) sources is an important issue by itself, resulting in discharge of large volumes at many ports (e.g., Valdez, Alaska and Chesapeake Bay), and can lead to unwanted biological invasions. Relatively little is known about management and delivery of ballast water that originates within the U.S. (e.g., San Francisco Bay to Chesapeake Bay, Chesapeake Bay to New Orleans). This information gap precludes the formation of critical management and policy decisions.
- The use of NOBOB (i.e., relatively empty) tanks for ballast operations upon arrival to the U.S can result in the discharge of residual organisms from foreign sources (that can result in new invasions). The use and management of these tanks, comprising 38.9% of all ballast tanks for reporting ships, is not

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addressed in the current program. However, comprehensive reporting for each port (with the current form) would measure the extent, pattern, and potential importance of this practice.

We believe there remains significant confusion about which vessels should report and when they should report. Comprehensive (foreign and coastwise) reporting would remove any uncertainty about which traffic should report, improve overall data quality, and address important gaps in the current program.

### **3. Implement Verification Surveys to Assess Accuracy of Reporting by Vessels.**

There remains a need for Verification Surveys, designed specifically to assess the accuracy of reporting by vessels. As a minimum, this requires design and implementation of a random, stratified sampling of vessel arrivals across the country, to include different vessel classes, geographic locations (ports), and seasons. This is the basic design of the pilot program for a Verification Survey, implemented by the U.S. Coast Guard. Particular attention should be given to resources (i.e., dedicated staff) necessary to complete this survey, including (a) targeted use of Clearinghouse staff for surveys during selected time periods and (b) use of selected key ports to represent broader geographic regions.

### **4. Obtain Data on Ballast Tank Capacities.**

**Additional information is required from each ship to estimate ballast water management.** Many errors exist on the ships' reports of "percent ballast water exchanged". As a result, we often cannot reliably estimate the percent of ballast water exchange performed on a "by tank" or "by vessel" basis. To correct this problem, we recommend two changes. First, the current reporting form should be modified, or some other mechanism implemented by U.S. Coast Guard, to obtain capacity for each ballast tank aboard reporting ships. Tank capacity is needed to calculate directly the percent ballast water exchange. Second, instructions on how to estimate percent ballast water exchange for the reporting form should be modified to include descriptions of common errors and how to avoid them.

### **5. Improve U.S. Coast Guard database for Vessel Arrivals.**

Although vessel arrival data collected by MARAD provide good quality data for most ports, significant gaps existed for Hawaii, Alaska, and Guam. The U.S. Coast Guard routinely collects such data on arrivals via the Advanced Notice of Arrival, in which ships are required to report key information prior to arrival. Furthermore, the U.S. Coast Guard maintains these data in their own database. However, up until now, the U.S. Coast Guard data for each vessel arrival did not consistently include standardized identifications of the last port of call, making these data of limited utility for

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Clearinghouse analyses. Specifically, the arrivals database could not be used to distinguish foreign versus coastwise traffic.

In October 2001, the U.S. Coast Guard database began to include standardized input to the critical field of “last port of call”. Should this new system be implemented fully, it will create a valuable resource of data on all arrivals. We recommend that the U.S. Coast Guard encourage full implementation (i.e., entry of standardized last port of call data for all arrivals). Maritime exchanges often collect excellent arrivals data, offering an alternate source of information, but there exist only a limited number of exchanges and these cannot currently provide nationwide coverage for all arrivals. Thus, in our view, full implementation of the U.S. Coast Guard database offers the best opportunity to remove the existing gaps in the data on vessel arrivals.

### **6. Promote use of Electronic Reporting.**

At the present time, most ships send reports to the Clearinghouse by FAX or mail. However, the use of electronic submission would greatly reduce the time required by ships to submit forms, since many fields of information remain unchanged at each submission. Electronic submission also would increase accuracy (removing problems associated with legibility), and reduce the effort in data entry and time needed to make the data accessible.

The Clearinghouse provides mechanisms for electronic submission, including (1) transmission of MS Excel™ or MS Word™ files via email and (2) use of an on-line form. Multiple modes for electronic submission have been in place on the Clearinghouse website (<http://invasions.si.edu/ballast.htm>) for the past 18 months.

We recommend that the U.S. Coast Guard promote and encourage, to the maximum extent possible, the electronic submission of data.

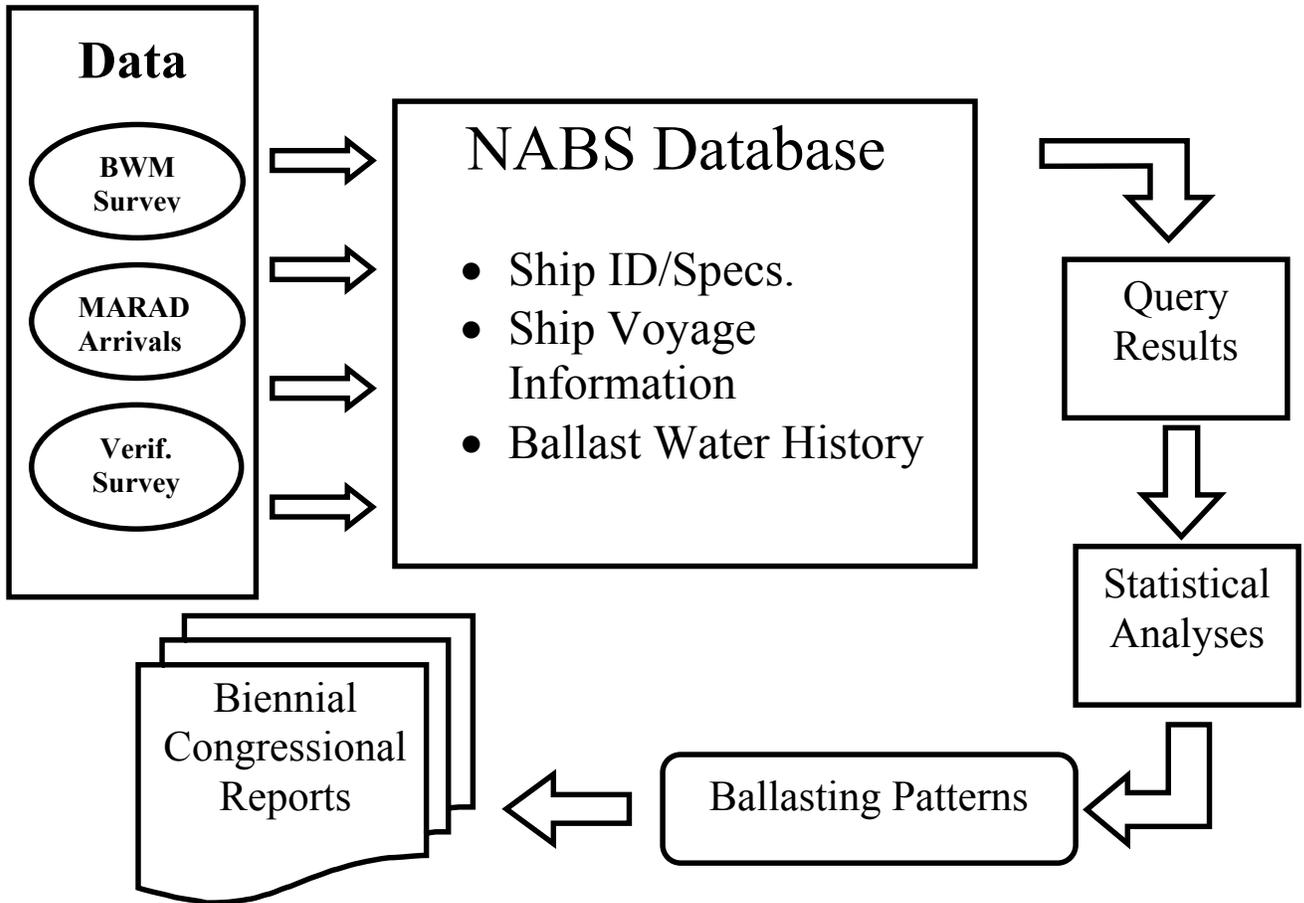


Figure 1. Flowchart describing the functional aspects of the National Ballast Survey (NABS).

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Figure 2. Captain of the Port Zone (COTPZ) designations for all coastal marine ports of the United States.

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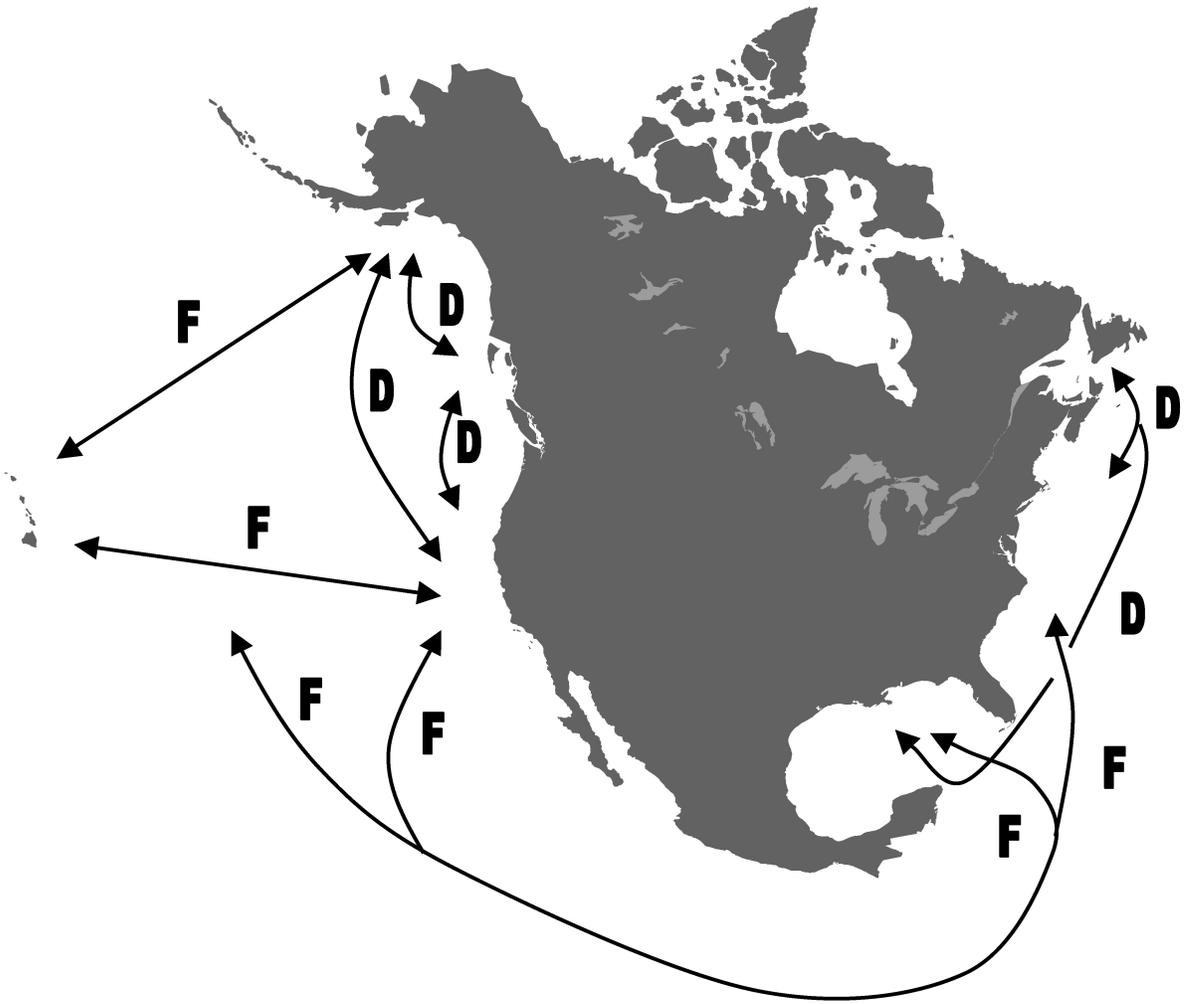


Figure 3. Foreign (F) and domestic (D) arrival designations for ships calling on ports of the United States and U.S. protectorates. Note: although not depicted on this map, transits between individual U.S. Caribbean islands were considered domestic while all other traffic to and from the Caribbean was deemed foreign.

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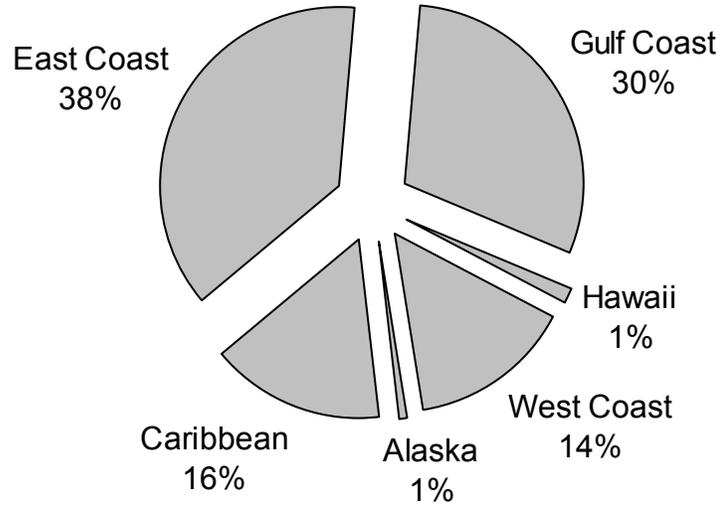


Figure 4. Percent foreign arrivals traffic by coast over two-year period from July 1999 to June 2001 (n= 95,471 arrivals). Data are from MARAD arrival reports from 1 July 1999 to 30 June 2001.

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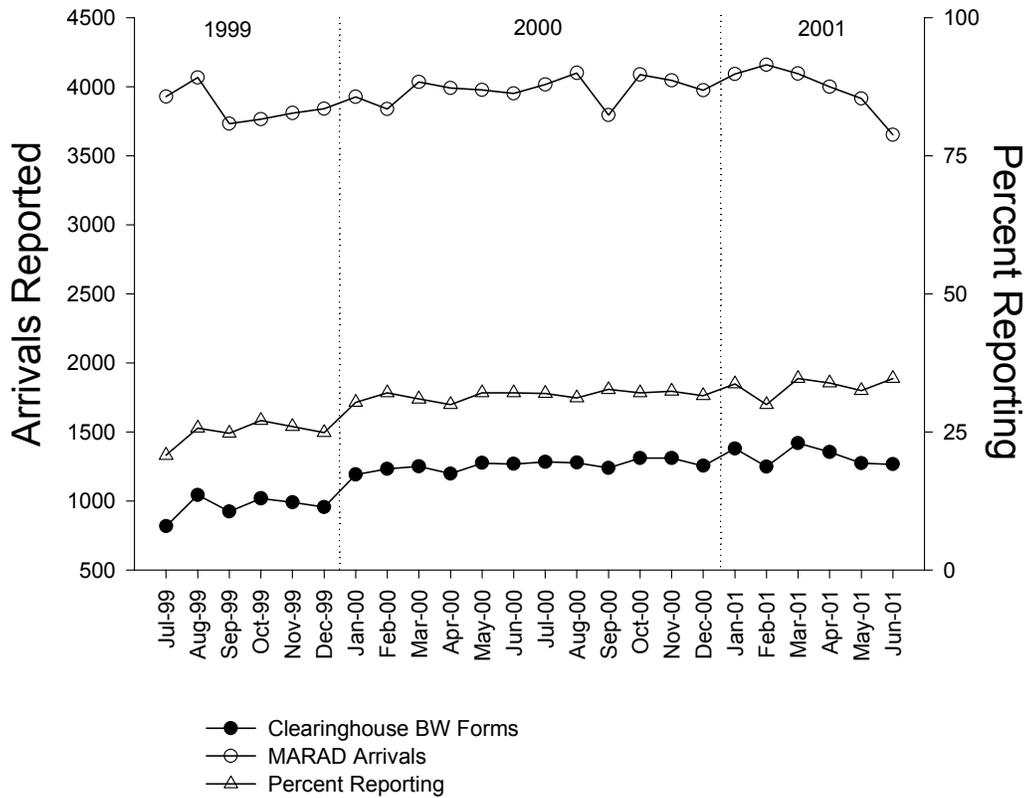


Figure 5. Monthly reporting rates for the nation by foreign arrivals from July 1999 to June 2001. Data are from National Ballast Survey (Clearinghouse) and Maritime Administration (MARAD) databases.

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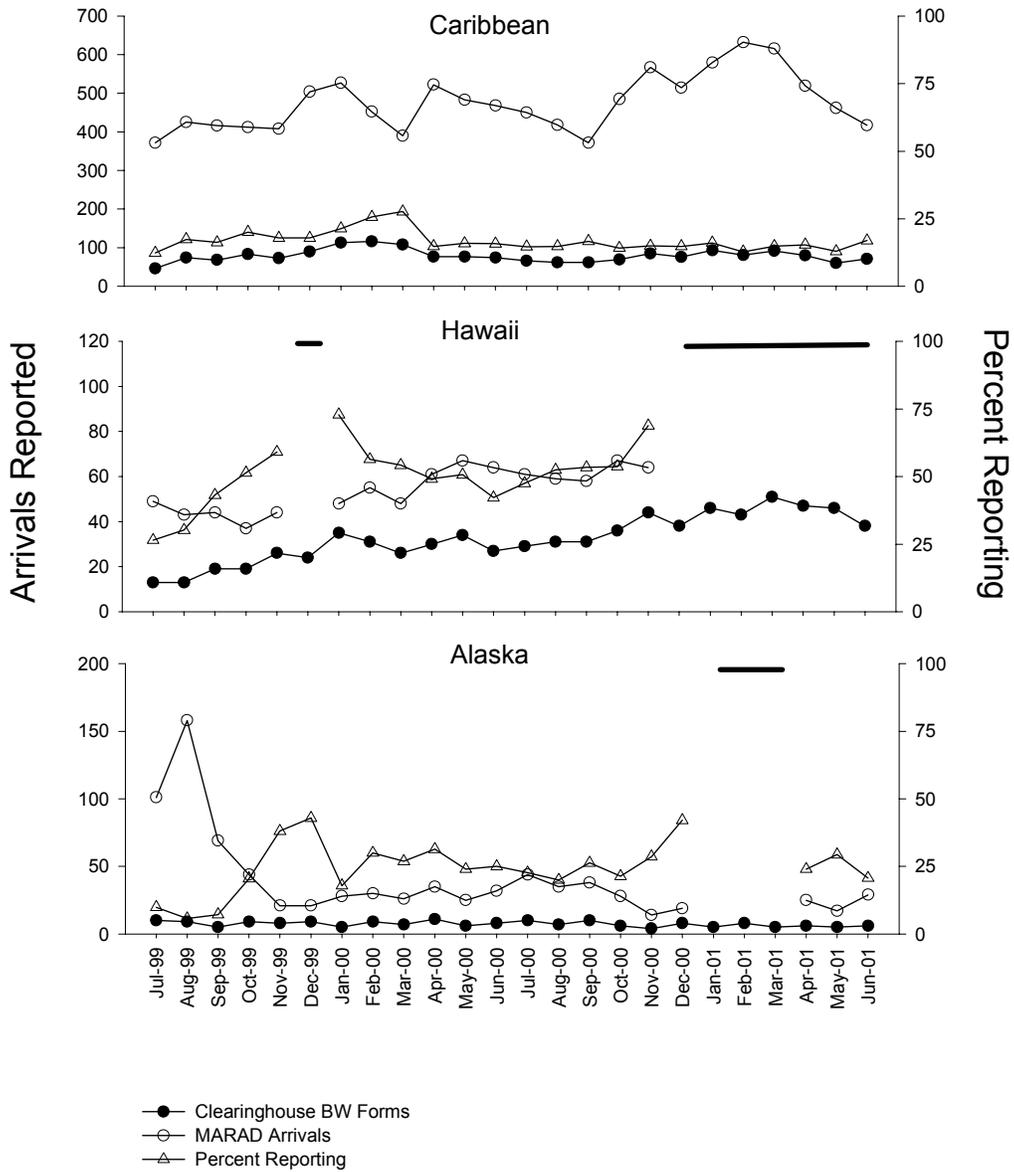


Figure 6a. Monthly reporting rates for East, Gulf of Mexico, and West coasts by foreign arrivals from July 1999 to June 2001. Data are from National Ballast Survey and Maritime Administration databases.

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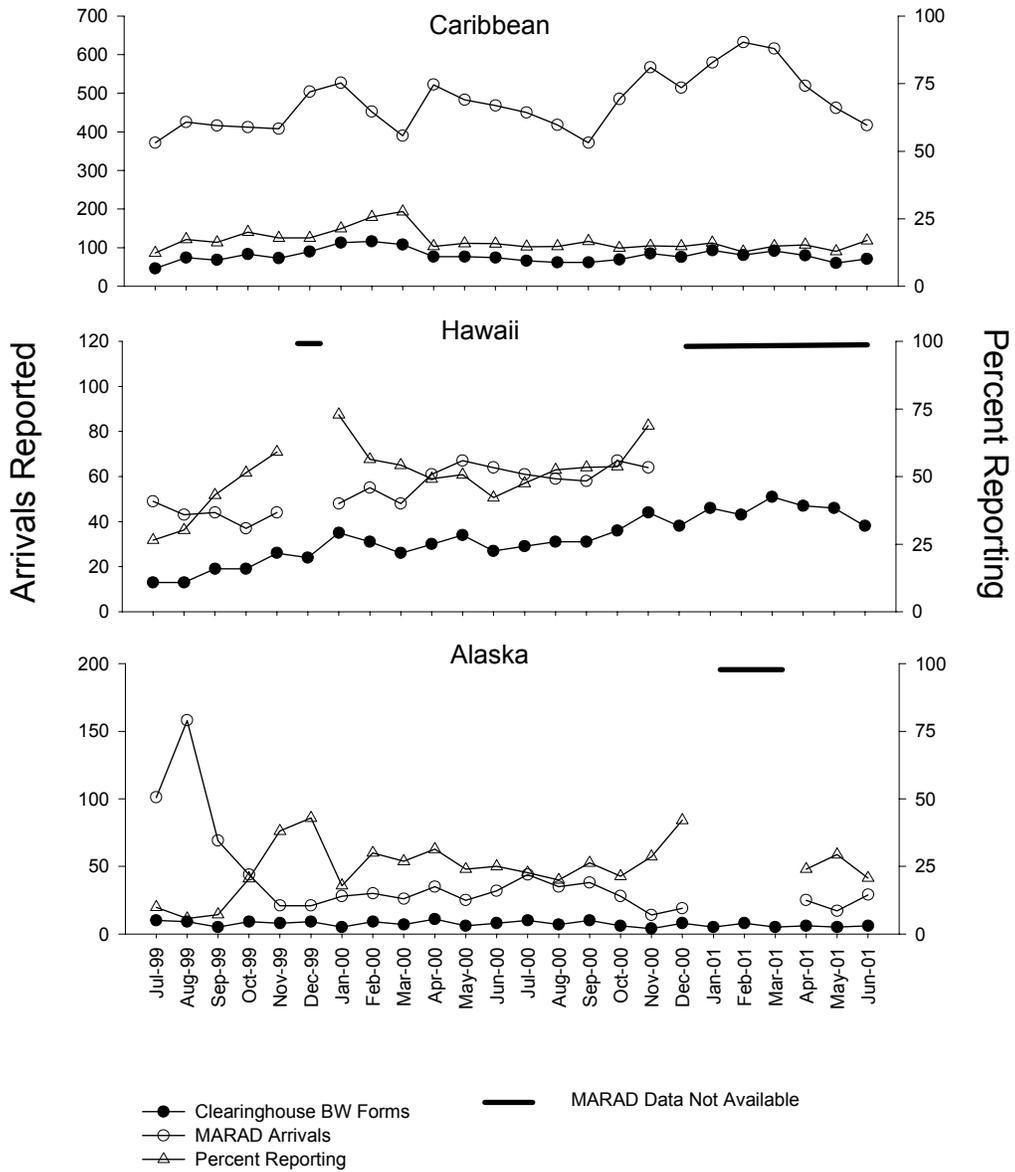


Figure 6b. Monthly reporting rates for the Caribbean, Hawaii, and Alaska coasts by foreign arrivals from July 1999 to June 2001. Data are from National Ballast Survey and Maritime Administration databases.

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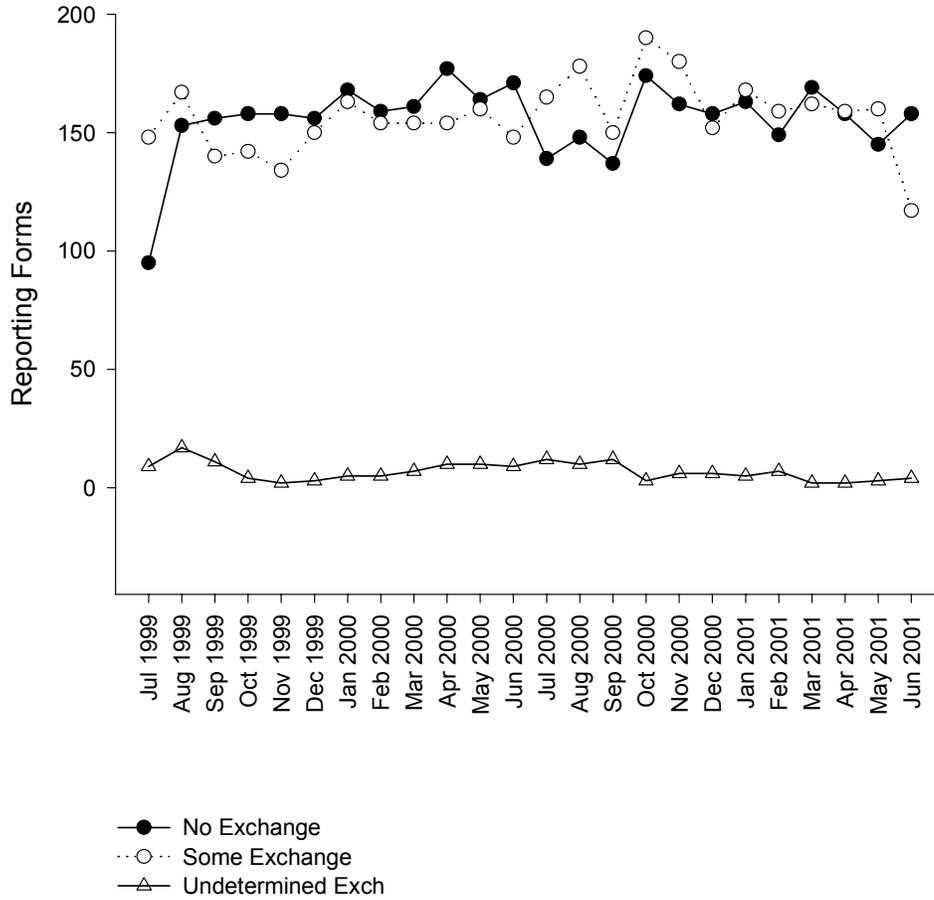


Figure 7. Nationwide monthly reported ballast water discharge by management strategy. Data from the National Ballast Survey database (July 1999 to June 2001).

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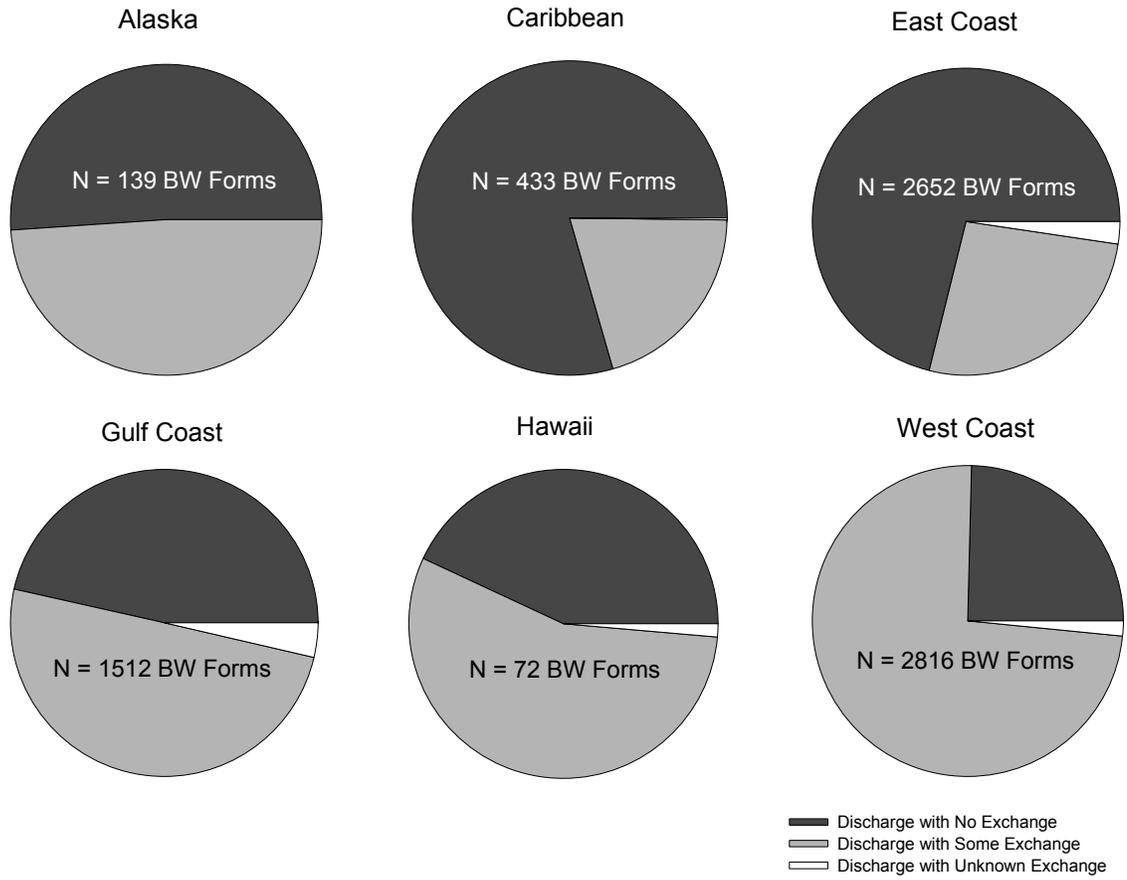


Figure 8. Proportion of ships discharging ballast water by coastal region and management strategy. Data from the National Ballast Survey database (July 1999 to June 2001).

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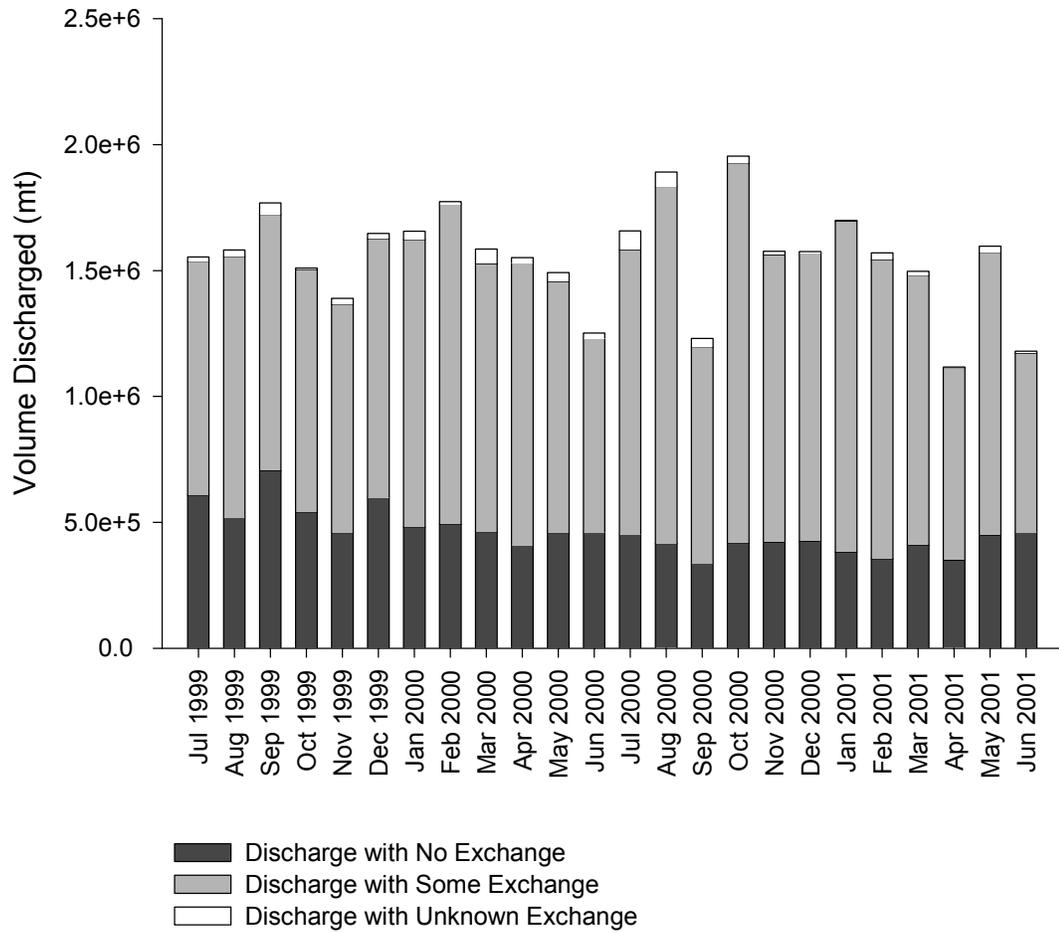


Figure 9. Nationwide monthly ballast water discharge volumes by management strategy. Data are from National Ballast Survey database (July 1999 to June 2001).

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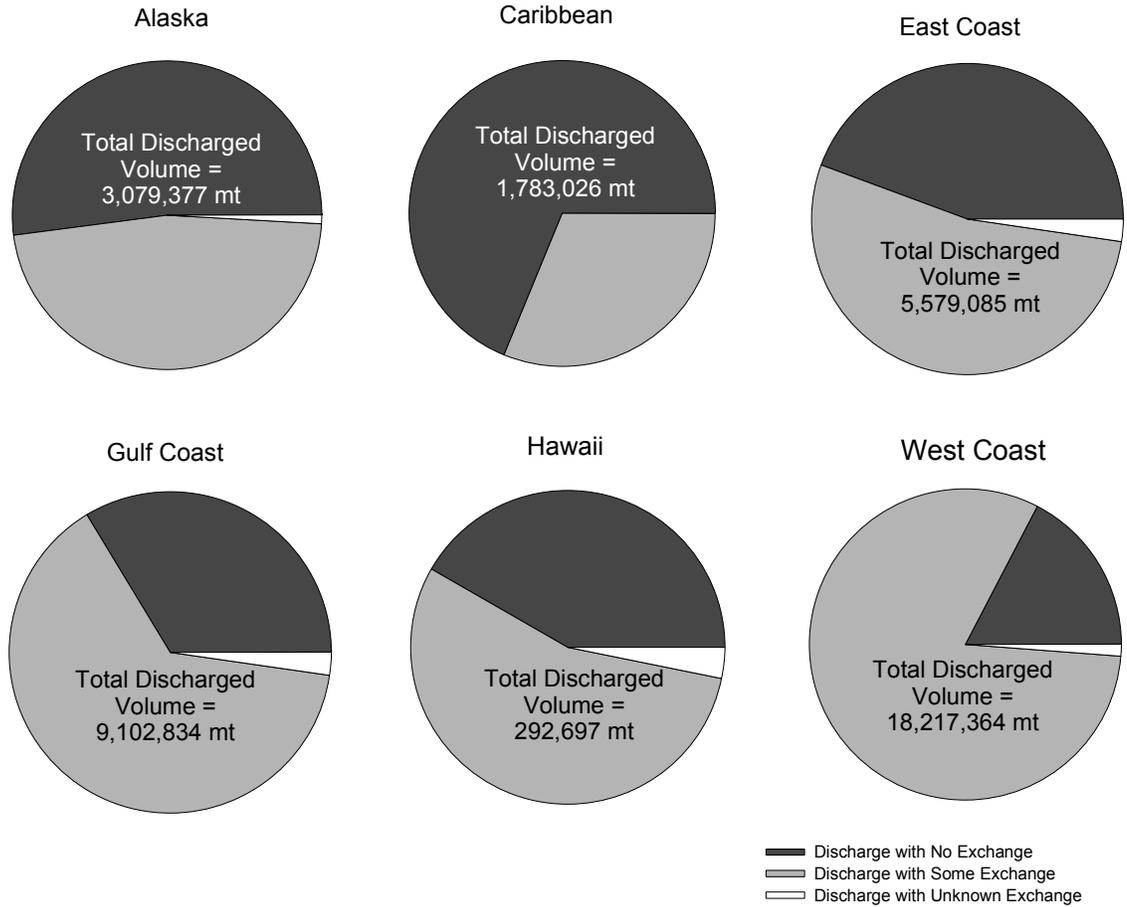


Figure 10. Proportion of ballast water discharged by coastal region and management strategy. Data from the National Ballast Survey database (July 1999 to June 2001).

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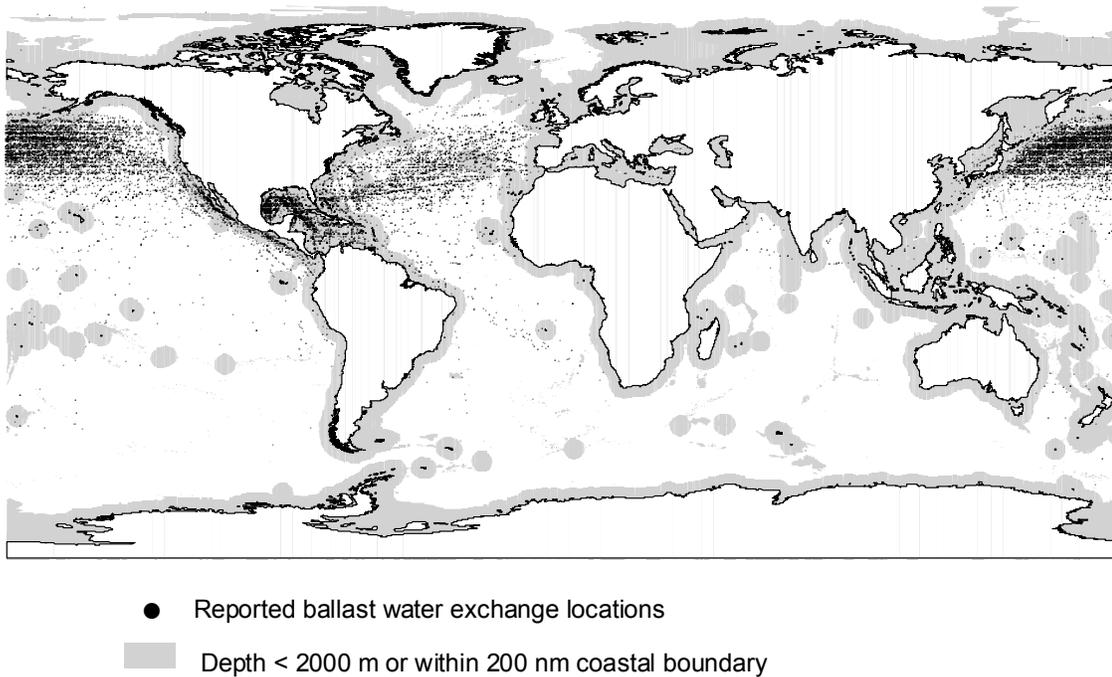


Figure 11. Reported ballast water exchange locations (end-points of exchange) for individual ballast tanks on vessels arriving to the United States between July 1999 and June 2001. Gray shading indicates zones within 200 nautical miles of coastlines and depths of less than 2,000 meters.

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Table 1. Comparisons of foreign arrivals as quantified by MARAD and Maritime Exchange.

<b>Port</b>	<b>Year</b>	<u>No. Foreign Arrivals</u>	
		<b>Maritime Exchange</b>	<b>MARAD</b>
Baltimore	1998 (first quarter)	150	151 (+0.01%)
Baltimore	1997	644	649 (+0.07%)
Boston	1997	495	554 (+12%)
San Francisco	1996	642	757 (+17%)
San Francisco	1995	715	816 (+14%)

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Table 2. Compliance with mandatory ballast reporting requirements, by coast and Captain of the Port Zone. Data from National Ballast Survey and MARAD databases (July 1999 to June 2001). Shaded rows show subtotals for broad coastal regions.

U. S. Coast	COTPZ	Year 1			Year 2			Total BWR Forms	Total MARAD Forms	% Reporting Rate Cumulative
		# BWR Forms	# MARAD Arrivals	% Reporting Rate	# BWR Forms	# MARAD Arrivals	% Reporting Rate			
Alaska	ANCMS	72	515	14.0%	66	213	31.0%	138	728	19.0%
Alaska	JUNMS	11	50	22.0%	13	41	31.7%	24	91	26.4%
Alaska	VALMS	13	25	52.0%	1	3	33.3%	14	28	50.0%
Alaska	Subtotal	96	590	16.3%	80	257	31.1%	176	847	20.8%
Carib	SJPMS	999	5,379	18.6%	897	6,031	14.9%	1,896	11,410	16.6%
East	BALMS	155	602	25.7%	219	629	34.8%	374	1,231	30.4%
East	BOSMS	112	439	25.5%	96	486	19.8%	208	925	22.5%
East	CHAMS	275	884	31.1%	360	923	39.0%	635	1,807	35.1%
East	HMRMS	125	488	25.6%	98	495	19.8%	223	983	22.7%
East	JACMS	518	2,144	24.2%	682	1,957	34.8%	1,200	4,101	29.3%
East	LISCP	30	75	40.0%	38	241	15.8%	68	316	21.5%
East	MIAMS	1,585	7,656	20.7%	2,293	7,545	30.4%	3,878	15,201	25.5%
East	NYCCP	823	2,380	34.6%	892	2,917	30.6%	1,715	5,297	32.4%
East	PHIMS	820	2,154	38.1%	731	2,086	35.0%	1,551	4,240	36.6%
East	POMMS	191	497	38.4%	178	381	46.7%	369	878	42.0%
East	PROMS	13	184	7.1%	17	112	15.2%	30	296	10.1%
East	SAVMS	175	654	26.8%	266	761	35.0%	441	1,415	31.2%
East	WNCMS	38	267	14.2%	56	240	23.3%	94	507	18.5%
East	Subtotal	4,860	18,424	26.4%	5,926	18,773	31.6%	10,786	37,197	29.0%
G of M	CORMS	213	1,147	18.6%	201	1,088	18.5%	414	2,235	18.5%
G of M	HOUCP	765	4,887	15.7%	870	4,963	17.5%	1,635	9,850	16.6%
G of M	MOBMS	184	1,496	12.3%	263	1,606	16.4%	447	3,102	14.4%
G of M	NEWMS	744	4,619	16.1%	752	5,030	15.0%	1,496	9,649	15.5%
G of M	PATMS	138	1,072	12.9%	169	1,213	13.9%	307	2,285	13.4%
G of M	TAMMS	348	992	35.1%	336	1,046	32.1%	684	2,038	33.6%
G of M	Subtotal	2,392	14,213	16.8%	2,591	14,946	17.3%	4,983	29,159	17.1%
Hawaii	HONMS	298	651	45.8%	481	896	53.7%	779	1,547	50.4%
Other	GUAD	93	N/A	N/A	100	N/A	N/A	193	N/A	N/A
West	LOSMS	2,792	4,301	64.9%	3,307	4,271	77.4%	6,099	8,572	71.2%
West	PORMS	442	942	46.9%	621	947	65.6%	1,063	1,889	56.3%
West	SDCMS	150	653	23.0%	228	674	33.8%	378	1,327	28.5%
West	SEAMS	556	1,050	53.0%	716	922	77.7%	1,272	1,972	64.5%
West	SFCMS	588	747	78.7%	775	804	96.4%	1,363	1,551	87.9%
West	Subtotal	4,528	7,693	58.9%	5,647	7,618	74.1%	10,175	15,311	66.5%
	<b>Total</b>	<b>13,266</b>	<b>46,950</b>	<b>28.3%</b>	<b>15,722</b>	<b>48,521</b>	<b>32.4%</b>	<b>28,988</b>	<b>95,471</b>	<b>30.4%</b>

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Table 3a. Year 1 compliance with voluntary ballast water management guidelines, by coast and Captain of the Port Zone. Data from National Ballast Survey database (July 1999 to June 2000). Shaded rows show subtotals for broad coastal regions.

U. S. Coast	COTPZ	# BWR Forms Year 1	# Zero Discharge	% Zero Discharge	# Zero Exchange	% Zero Exchange	# Some Exchange	% Some Exchange	# Unknown Exchange	% Unknown Exchange
Alaska	ANCMS	72	14	19.4%	35	48.6%	23	31.9%	0	0.0%
Alaska	JUNMS	11	2	18.2%	0	0.0%	9	81.8%	0	0.0%
Alaska	VALMS	13	3	23.1%	2	15.4%	8	61.5%	0	0.0%
Alaska	Subtotal	96	19	19.8%	37	38.5%	40	41.7%	0	0.0%
Carib	SJPMS	999	737	73.8%	214	21.4%	48	4.8%	0	0.0%
East	BALMS	155	139	89.7%	2	1.3%	13	8.4%	1	0.6%
East	BOSMS	112	87	77.7%	20	17.9%	5	4.5%	0	0.0%
East	CHAMS	275	210	76.4%	29	10.5%	31	11.3%	5	1.8%
East	HMRMS	125	79	63.2%	14	11.2%	30	24.0%	2	1.6%
East	JACMS	518	350	67.6%	151	29.2%	13	2.5%	4	0.8%
East	LISCP	30	27	90.0%	2	6.7%	1	3.3%	0	0.0%
East	MIAMS	1,585	943	59.5%	552	34.8%	85	5.4%	5	0.3%
East	NYCCP	823	670	81.4%	73	8.9%	62	7.5%	18	2.2%
East	PHIMS	820	760	92.7%	12	1.5%	46	5.6%	2	0.2%
East	POMMS	191	178	93.2%	6	3.1%	6	3.1%	1	0.5%
East	PROMS	13	12	92.3%	1	7.7%	0	0.0%	0	0.0%
East	SAVMS	175	139	79.4%	6	3.4%	26	14.9%	4	2.3%
East	WNCMS	38	28	73.7%	3	7.9%	7	18.4%	0	0.0%
East	Subtotal	4,860	3,622	74.5%	871	17.9%	325	6.7%	42	0.9%
G of M	CORMS	213	164	77.0%	21	9.9%	25	11.7%	3	1.4%
G of M	HOUCP	765	521	68.1%	118	15.4%	116	15.2%	10	1.3%
G of M	MOBMS	184	142	77.2%	12	6.5%	29	15.8%	1	0.5%
G of M	NEWMS	744	462	62.1%	135	18.1%	141	19.0%	6	0.8%
G of M	PATMS	138	108	78.3%	9	6.5%	21	15.2%	0	0.0%
G of M	TAMMS	348	233	67.0%	77	22.1%	33	9.5%	5	1.4%
G of M	Subtotal	2,392	1,630	68.1%	372	15.6%	365	15.3%	25	1.0%
Hawaii	HONMS	298	258	86.6%	17	5.7%	23	7.7%	0	0.0%
Other	GUAD	93	82	88.2%	3	3.2%	8	8.6%	0	0.0%
West	LOSMS	2,792	2,033	72.8%	277	9.9%	465	16.7%	17	0.6%
West	PORMS	442	174	39.4%	19	4.3%	247	55.9%	2	0.5%
West	SDCMS	150	118	78.7%	8	5.3%	22	14.7%	2	1.3%
West	SEAMS	556	372	66.9%	17	3.1%	165	29.7%	2	0.4%
West	SFCMS	588	440	74.8%	40	6.8%	106	18.0%	2	0.3%
West	Subtotal	4,528	3,137	69.3%	361	8.0%	1,005	22.2%	25	0.6%
<b>Total</b>	<b>Year 1</b>	<b>13,266</b>	<b>9,485</b>	<b>71.5%</b>	<b>1,875</b>	<b>14.1%</b>	<b>1,814</b>	<b>13.7%</b>	<b>92</b>	<b>0.7%</b>

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Table 3b. Year 2 compliance with voluntary ballast water management guidelines, by coast and Captain of the Port Zone. Data from National Ballast Survey database (July 2000 to June 2001). Shaded rows show subtotals for broad coastal regions.

U. S. Coast	COTPZ	# BWR Forms Year 1	# Zero Discharge	% Zero Discharge	# Zero Exchange	% Zero Exchange	# Some Exchange	% Some Exchange	# Unknown Exchange	% Unknown Exchange
Alaska	ANCMS	66	15	22.7%	34	51.5%	17	25.8%	0	0.0%
Alaska	JUNMS	13	3	23.1%	0	0.0%	10	76.9%	0	0.0%
Alaska	VALMS	1	0	0.0%	0	0.0%	1	100.0%	0	0.0%
Alaska	Subtotal	80	18	22.5%	34	42.5%	28	35.0%	0	0.0%
Carib	SJPMS	897	726	80.9%	130	14.5%	40	4.5%	1	0.1%
East	BALMS	219	201	91.8%	3	1.4%	15	6.8%	0	0.0%
East	BOSMS	96	94	97.9%	1	1.0%	1	1.0%	0	0.0%
East	CHAMS	360	315	87.5%	15	4.2%	30	8.3%	0	0.0%
East	HMRMS	98	63	64.3%	11	11.2%	23	23.5%	1	1.0%
East	JACMS	682	535	78.4%	128	18.8%	15	2.2%	4	0.6%
East	LISCP	38	35	92.1%	2	5.3%	1	2.6%	0	0.0%
East	MIAMS	2,293	1,402	61.1%	741	32.3%	147	6.4%	3	0.1%
East	NYCCP	892	764	85.7%	84	9.4%	37	4.1%	7	0.8%
East	PHIMS	731	671	91.8%	19	2.6%	39	5.3%	2	0.3%
East	POMMS	178	168	94.4%	4	2.2%	6	3.4%	0	0.0%
East	PROMS	17	17	100.0%	0	0.0%	0	0.0%	0	0.0%
East	SAVMS	266	212	79.7%	5	1.9%	46	17.3%	3	1.1%
East	WNCMS	56	35	62.5%	3	5.4%	17	30.4%	1	1.8%
East	Subtotal	5,926	4,512	76.1%	1,016	17.1%	377	6.4%	21	0.4%
G of M	CORMS	201	161	80.1%	28	13.9%	12	6.0%	0	0.0%
G of M	HOUCP	870	614	70.6%	90	10.3%	144	16.6%	22	2.5%
G of M	MOBMS	263	213	81.0%	10	3.8%	40	15.2%	0	0.0%
G of M	NEWMS	752	470	62.5%	120	16.0%	157	20.9%	5	0.7%
G of M	PATMS	169	141	83.4%	12	7.1%	13	7.7%	3	1.8%
G of M	TAMMS	336	242	72.0%	71	21.1%	23	6.8%	0	0.0%
G of M	Subtotal	2,591	1,841	71.1%	331	12.8%	389	15.0%	30	1.2%
Hawaii	HONMS	481	448	93.1%	15	3.1%	17	3.5%	1	0.2%
Other	GUAD	100	84	84.0%	2	2.0%	14	14.0%	0	0.0%
West	LOSMS	3,307	2,612	79.0%	252	7.6%	430	13.0%	13	0.4%
West	PORMS	621	264	42.5%	13	2.1%	340	54.8%	4	0.6%
West	SDCMS	228	199	87.3%	15	6.6%	13	5.7%	1	0.4%
West	SEAMS	716	503	70.3%	26	3.6%	187	26.1%	0	0.0%
West	SFCMS	775	644	83.1%	25	3.2%	105	13.5%	1	0.1%
West	Subtotal	5,647	4,222	74.8%	331	5.9%	1,075	19.0%	19	0.3%
<b>Total</b>	<b>Year 2</b>	<b>15,722</b>	<b>11,851</b>	<b>75.4%</b>	<b>1,859</b>	<b>11.8%</b>	<b>1,940</b>	<b>12.3%</b>	<b>72</b>	<b>0.5%</b>
<b>Grand Total</b>		<b>28,988</b>	<b>21,336</b>	<b>73.6%</b>	<b>3,734</b>	<b>12.9%</b>	<b>3,754</b>	<b>13.0%</b>	<b>164</b>	<b>0.6%</b>

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Table 4. Compliance with voluntary guidelines by volume for management of ballast water during period from July 1999 to June 2001. Shaded rows show subtotals for broad coastal regions.

US Coast	COTPZ	No Exchange		Some Exchange		Unknown Exchange	
		[mt]	[%]	[mt]	[%]	[mt]	[%]
Alaska	ANCMS	1,894,957	79.3%	493,655	20.7%	1,800	0.1%
Alaska	JUNMS	2,177	1.9%	110,873	98.1%	0	0.0%
Alaska	VALMS	222,062	38.6%	353,853	61.4%	0	0.0%
East							
East	BALMS	86,389	14.0%	508,524	82.5%	21,780	3.5%
East	BOSMS	48,207	85.7%	8,013	14.3%	0	0.0%
East	CHAMS	58,204	41.4%	74,315	52.9%	7,987	5.7%
East	HMRMS	370,686	21.3%	1,335,139	76.7%	35,190	2.0%
East	JACMS	274,989	90.0%	28,364	9.3%	2,184	0.7%
East	LISCP	4,276	88.6%	548	11.4%	0	0.0%
East	MIAMS	1,046,990	88.4%	133,511	11.3%	3,330	0.3%
East	NYCCP	150,048	53.8%	113,851	40.8%	15,243	5.5%
East	PHIMS	281,871	60.8%	163,756	35.3%	18,298	3.9%
East	POMMS	72,051	46.6%	71,651	46.4%	10,810	7.0%
East	PROMS	17,559	100.0%	0	0.0%	0	0.0%
East	SAVMS	40,938	13.8%	239,466	80.9%	15,457	5.2%
East	WNCMS	23,514	7.4%	294,633	92.2%	1,314	0.4%
Subtotal		2,475,722					
G of M	CORMS	453,238	60.1%	267,287	35.4%	34,064	4.5%
G of M	HOUCP	1,193,966	50.6%	1,105,637	46.9%	57,697	2.4%
G of M	MOBMS	106,493	19.1%	449,355	80.5%	2,289	0.4%
G of M	NEWMS	837,110	20.6%	3,154,942	77.7%	67,042	1.7%
G of M	PATMS	274,360	43.1%	336,925	53.0%	24,759	3.9%
G of M	TAMMS	196,920	26.7%	518,357	70.3%	22,393	3.0%
West							
West	LOSMS	1,326,599	21.7%	4,705,304	76.9%	87,624	1.4%
West	PORMS	438,022	7.1%	5,621,938	91.5%	86,321	1.4%
West	SDCMS	18,001	12.7%	111,681	78.6%	12,354	8.7%
West	SEAMS	277,842	9.6%	2,588,297	89.1%	37,381	1.3%
West	SFCMS	296,831	14.1%	1,809,326	85.8%	3,160	0.1%
Subtotal			13.5%	14,836,546	85.2%	226,840	1.3%
<b>Total</b>		<b>11,076,977</b>	<b>29.7%</b>	<b>25,623,912</b>	<b>68.7%</b>	<b>594,504</b>	<b>1.6%</b>

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Table 5. Reasons provided by vessel masters for not exchanging ballast water to be discharged in U. S. waters. The categories were constructed by the Clearinghouse, and individual reports were assigned as best as possible. Reporting period was July 1999 to June 2001.

Reason Provided	Total BWR Forms [#]	% of Total
Clean Ballast	184	15.2%
Itinerary	159	13.2%
N/A	127	10.5%
Other/Undecipherable	650	53.8%
Safety	56	4.6%
Ship's Design	32	2.6%
<b>TOTAL</b>	<b>1,208</b>	<b>100%</b>

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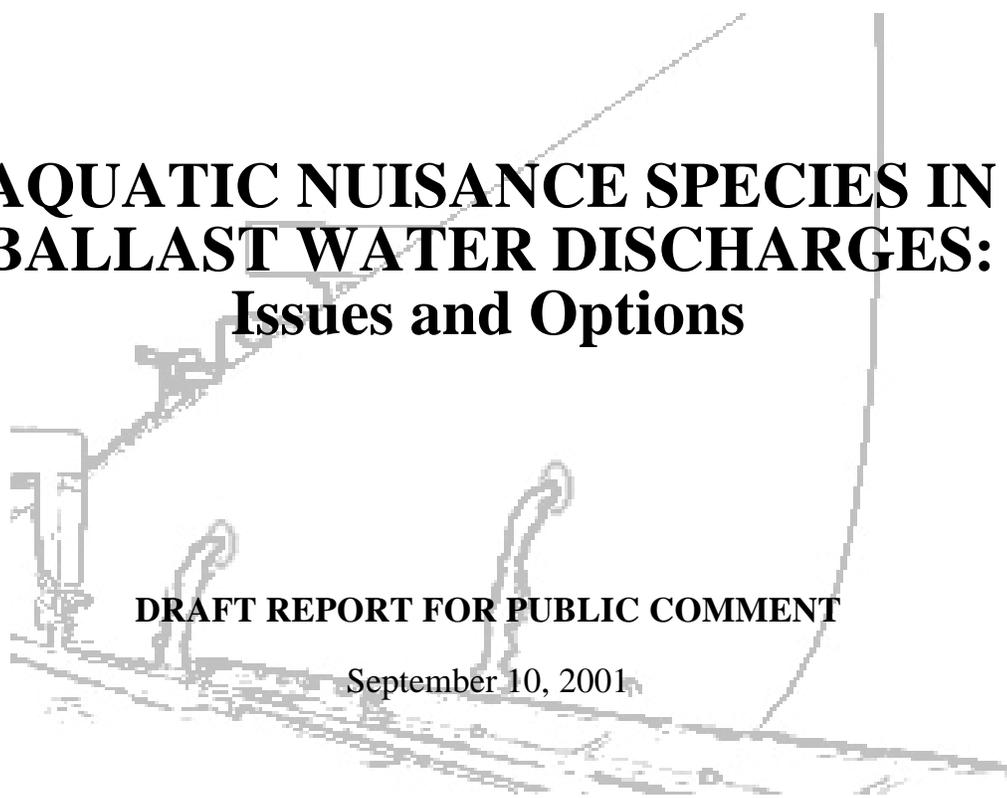
Table 6. Comparison of no ballast on board (NOBOB) and ballast on board (BOB) vessels and tanks based on total number of foreign arrivals and total tanks that arrived to U.S. ports between July 1999 and June 2001.

<b>Vessel Condition</b>	<b>Vessel No.</b>	<b>%</b>	<b>Vessel No.</b>	<b>%</b>
NOBOB	3,712	12.8%	3,712	12.8%
BOB	25,280	87.2%	25,280	87.2%
<b>Total</b>	<b>28,992</b>	<b>100%</b>	<b>28,992</b>	<b>100%</b>

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Table 7. Average number of NOBOB tanks and BOB tanks aboard 24,607 foreign arrivals that carried at least one NOBOB tank. Reporting period was from July 1999 to June 2001.

<b>Tank Condition</b>	<b>Mean No. of Tanks</b>	<b>Standard Error</b>
NOBOB tanks	8.6	0.05
BOB tanks	8.5	0.04
<b>All Tanks</b>	<b>17.2</b>	<b>0.05</b>



# **AQUATIC NUISANCE SPECIES IN BALLAST WATER DISCHARGES: Issues and Options**

**DRAFT REPORT FOR PUBLIC COMMENT**

September 10, 2001

Prepared by:  
U.S. Environmental Protection Agency Office of Water  
Office of Wetlands, Oceans and Watersheds  
Office of Wastewater Management  
Washington, DC

## PREFACE

This draft report, *Aquatic Nuisance Species in Ballast Water Discharges: Issues and Options* was prepared in response to a petition the U.S. Environmental Protection Agency (EPA) received on January 13, 1999, from the Pacific Environmental Advocacy Center. The petition was filed on behalf of fifteen nongovernmental and State and Tribal governmental organizations. The petition asked that EPA eliminate a regulatory exemption that currently prevents ballast water discharges from vessels from needing permits under EPA's National Pollutant Discharge Elimination System (NPDES) program. The petition was closely followed by a letter from eighteen members of Congress, requesting that EPA examine whether the Clean Water Act can be used to provide effective regulation of aquatic nuisance species in vessel ballast water.

In response to the petition, Congress's inquiry, and the growing national concern about aquatic nuisance species introductions, former Assistant Administrator for Water J. Charles Fox directed Office of Water staff to research the issue of aquatic nuisance species in ballast water discharges, and report back what mechanisms are available under the Clean Water Act or other relevant statutes or programs to effectively control the introduction of aquatic nuisance species through ballast water.

EPA is seeking public comment on this draft report, and will finalize the report, taking into account public comments received.

If you have information or comments, please email them to *Ballast.Water@epa.gov*, or mail them to: Marine Pollution Control Branch, ATTN: Ballast Water, US Environmental Protection Agency (4504F), 1200 Pennsylvania Avenue, NW, Washington, DC, 20460. Please include your name, affiliation, address, phone number and/or email address. All comments received before January 11, 2002, will be made part of the official record, and will be considered when finalizing the report.

An electronic copy of the entire draft report can be viewed or downloaded from EPA's internet web site at "[http://www.epa.gov/owow/invasive\\_species/petition.html](http://www.epa.gov/owow/invasive_species/petition.html)". A paper copy of the draft report can be obtained by sending a written request to: Marine Pollution Control Branch, ATTN: Ballast Water, US Environmental Protection Agency (4504F), 1200 Pennsylvania Avenue, NW, Washington, DC, 20460.

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## **1.. EXECUTIVE SUMMARY**

### **a. Purpose of Report**

This draft report examines the issue of aquatic nuisance species (ANS) introduction by the discharge of ballast water from vessels. It first discusses vessel traffic and the technical aspects of ballast water management. It then surveys existing Federal, State and international actions to address ANS. The draft report then discusses options for controlling ballast water through legal, technical, and practical mechanisms. It identifies regulatory and non-regulatory actions that the EPA and other agencies are taking or might take to minimize the spread of aquatic nuisance species in ballast water. Finally, the draft report proposes recommendations about what actions EPA should take to address the issue of preventing aquatic nuisance species spread by ballast water.

### **b. Summary of Draft Recommendations**

This draft report finds that the greatest impediment to effectively controlling ANS introductions from ballast water discharges is the current lack of technical solutions to remove ANS from ballast water discharges. While mid-ocean ballast water exchange may offer some relief from ANS introductions, it has significant shortcomings. It is not effective in removing 100% of organisms in ballast water, it can involve significant safety risks to vessels during adverse weather, it cannot be practically applied to most domestic U.S. traffic, and it is difficult to inspect for compliance. However, regulatory and scientific developments are expected to provide significant new tools in the fight against ballast water ANS, and EPA believes it can best combat ANS introductions by taking a leadership role in those developments. Therefore, this draft report proposes the following recommendations for EPA actions:

One: EPA should promote the development of effective ballast water treatment technologies by:

- Actively promoting research, outreach, and technology development through its participation in the ANS Task Force, the Invasive Species Council, and their appropriate committees and working groups on ballast water;
- Promoting technology development, for example through its Environmental Technology Verification (ETV), Small Business Innovative Research, and Green Ships and Green Ports programs;
- Establishing the prevention of ANS introductions as an EPA research priority;
- Providing technical assistance to ANS research projects initiated or funded by the National Oceanic and Atmospheric Administration (NOAA), the U.S. Fish and Wildlife Service (USFWS), the U.S. Coast Guard, or other government, academic, or non-governmental organizations;
- Supporting the U.S. Coast Guard's efforts to evaluate the effectiveness of its regulations and to revise them, if necessary to enhance their effectiveness in preventing ANS introductions, including the development of domestic ballast water standards and encouraging the development and adoption of new technologies; and
- Continuing EPA's participation on the U.S. delegation to the Ballast Water Working group of the Marine Environmental Protection Committee of the International Maritime Organization, which is working toward an international ballast water agreement, including developing standards.

Two: EPA should work to prevent species introductions by:

- Encouraging public participation and education/outreach (e.g., through the National Estuary Programs, Great Waters programs, Aquatic Nuisance Species Task Force, National Invasive Species Council, Interagency Committee on the Marine Transportation System, and web sites);
- Working with the U.S. Coast Guard to maximize compliance with its regulations at 33 CFR 151 by:
  - Providing technical assistance, coordination, and advocacy support to U.S. Coast Guard outreach, education, and research projects; and
  - Participating actively on the ANS Task Force, its regional Panels, and its Ballast Water Committees.
- In cooperation with other Federal agencies, engaging the regulated community in a government-shipper partnership emphasizing the use of Environmental Management Systems (EMS) to address all aspects of ship-borne transfers of ANS, by:
  - Formally recognizing the efforts of shipping interests which commit to real, significant actions that reduce the risk of ANS transfer;
  - Providing technical assistance, coordination, and where appropriate, financial support to shippers' projects designed to address ANS; and
  - Where appropriate, providing regulatory flexibility for ANS prevention projects using EPA's Project XL program;<sup>1</sup>
- Providing encouragement for national consistency and coordination to State and local governments' efforts to control ANS invasion from ballast water;
- Developing EPA's Invasive Species Management Plan to identify appropriate EPA-specific activities to implement the Invasive Species Council's National Invasive Species Management Plan;
- Using EPA's authority to review NEPA documents and other documentation, to promote the adequate consideration of the effects of ANS in Federal actions which involve ballast water; and
- Deferring consideration of the application of National Pollutant Discharge Elimination System (NPDES) permits to ballast water discharges pending these actions. The effectiveness of other programs, including the level of compliance with the U.S. Coast Guard's program under NISA, will be a factor in EPA's future consideration of this issue.

**c. Other Options for Addressing Ballast Water**

The report describes a number of different approaches by which EPA or other agencies might prevent or minimize the spread of ballast water ANS. They include:

- Working with the U.S. Coast Guard, using CWA Section 402(g), to incorporate National Invasive Species Act (NISA) requirements into NPDES permits;
- Using EPA's authority to review NEPA documents and other documentation, to promote the adequate consideration of the effects of ANS in Federal actions which involve ballast water; and

- Invoking EPA's Emergency Powers authority under CWA §504, to halt the discharge if a situation is found where the discharge of ballast water containing exotic species presents an imminent and substantial endangerment to public health or public welfare, for example, the ability to market shellfish.

## **2.. BACKGROUND**

### **a. Petition**

On January 13, 1999, the Pacific Environmental Advocacy Center submitted on behalf of the California Assembly, the Chippewa-Ottawa Treaty Fishery Management Authority, and a number of environmental advocacy groups, a petition to the Administrator stating that invasive species in ballast water were a major cause of environmental degradation in U.S. waters, and requesting that EPA eliminate the exemption under 40 CFR 122.3(a) for discharges that are incidental to normal operation of a vessel. The petition requested that ballast water be regulated under the NPDES program. The petition was closely followed by letter from eighteen members of Congress requesting that EPA examine whether the Clean Water Act can be used to provide effective regulation of ANS in vessel ballast water.

In response to the petition, Congress's inquiry, and the growing national concern about ANS introductions, the Assistant Administrator for Water directed Office of Water staff to research and report back what mechanisms are available under the Clean Water Act, or other relevant statutes or programs, to effectively control the introduction of ANS through ballast water.

### **b. Ballast Water ANS**

Ships have been sailing the world's seas for thousands of years. The suitability of ships as long-term homes to a wide variety of creatures led to use of the term "biological island" to describe the ship ecosystem.<sup>2</sup> The organisms that live aboard or in a ship have the opportunity to depart, or to disperse eggs or young, at each port of call, which resulted in extensive dispersal of many of the marine, estuarine, and even terrestrial species. Many species we usually consider native are really the result of anthropogenic introductions by ships over the last 500 years.

As the nature of ships and shipping changed, so did the nature of the organisms which lived and moved with the ships. Trade routes changed, creating new "donor regions" of potentially invasive species.<sup>3</sup> Ships traveled faster, so hitchhiking species were more likely to survive the voyage from the donor area to receiving waters. Ships' hulls were coated with antifouling paint to render them less hospitable to hitchhiking species, so that although some ANS are still transported on ship hulls, the primary vector for ANS transport at this time is probably ballast water.

As a ship's cargo is loaded and unloaded, the ship must accommodate changes in its weight and trim by taking on or discharging ballast water. For this purpose, ships use dedicated ballast water tanks, empty cargo or fuel tanks, or some combination of the three. A modern tanker ship working on the Great Lakes can contain as much as 14 million gallons of ballast water,<sup>4</sup> most of which would be discharged in port as the ship takes on its cargo. Seagoing tankers can carry twice that amount. Other kinds of cargo ships can carry from 100,000 to 5,000,000 gallons of ballast water. The total amount of ballast water discharged in U.S. waters each year is in excess of 21 billion gallons.<sup>5</sup>

It is estimated that more than 10,000 marine species each day hitch rides around the globe in the ballast water of cargo ships.<sup>6</sup> The volume of water is so enormous, and the transit time that organisms spend in ballast water tank is so short, that the number of species successfully invading new habitats via shipping pathways is increasing at an increasingly higher rate.<sup>7</sup> Table 1 shows a listing of all the species found in ballast water in a recent sampling research project.<sup>8</sup>

*AQUATIC NUISANCE SPECIES IN BALLAST WATER DISCHARGES: Issues and Options*  
**DRAFT FOR PUBLIC COMMENT – September 10, 2001**

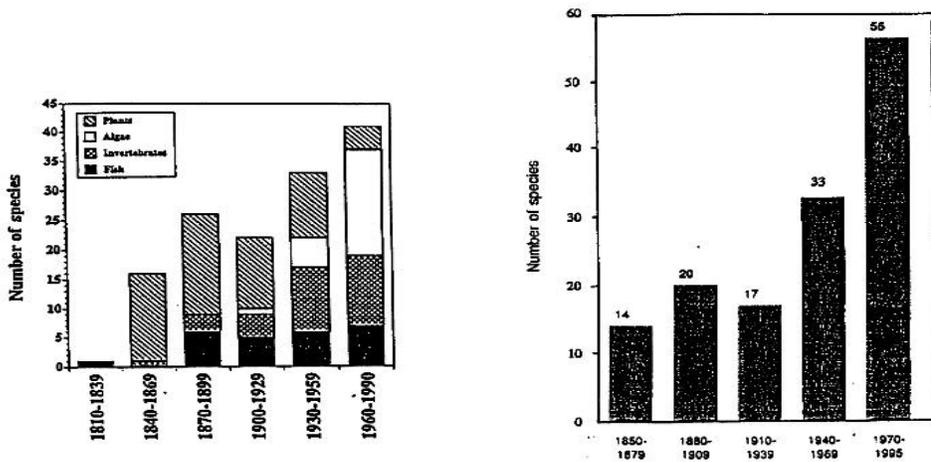
**Table 1.** Frequency of occurrence and abundance of organisms in ballast water from ships arriving from Japan to the Port of Coos Bay, Oregon, after a transoceanic trip of 11 to 21 days [average 15.1 (SD 1.9) days]. Specificity of identification depended on the phylum or division considered.

Taxon	Species (n)	Ships (%) in which taxon was			Present	Adult	
		Abundant (>100/replicate)	Common (10 to 100/replicate)	Rare (<10/replicate)		Habitat*	Trophic group†
<b>Crustacea</b>							
Cirripedia	5	11.0	31.0	41.0	83.0	HE	S
Harpacticoida	5	17.0	29.0	28.0	74.0	HE, SE, PL, EB	SC, H
Calanoida and Cyclopeida	25	61.6	25.7	11.3	98.6	PL, SE	C, H, SC
Decapoda	14	3.1	4.4	40.8	48.3	SE, HE, EB	O, H, C, D, SC, S
Euphausiacea	1	0	0	1.3	1.3	PL	O
Stomatopoda	1	0	0	2.5	2.5	HE, SE	C
Cumacea	3	0.6	1.3	11.3	13.2	SE, I, PL	D
Mysidacea	2	0.6	5.0	28.0	33.6	SE, PL	H, D
Isopoda	4	0	1.3	32.1	33.4	HE, EB	SC, O, D, H, P
Caprellidea	1	0	0	2.5	2.5	EB	C, O
Gammaridea	8	0	1.4	22.0	23.4	SE, HE	H, D, S
Hyperiidea	1	0	0	10.7	10.7	PL	C
Ostracoda	1	0	0	2.5	2.5	HE, SE, PL	H
Cladocera	1	0	0	0.6	0.6	PL	H
<b>Chelicerata</b>							
Acarina	1	0	0	5.0	5.0	HE	D, SC
<b>Echinodermata</b>							
Asteroidea	1	1.2	1.9	11.3	14.4	HE, SE	C, SC
Echinoidea	2	0.6	1.9	15.0	17.5	HE, SE	H, SC
Ophiuroidea	1	0	0	3.1	3.1	HE, SE	D, SC
Holothuroidea	2	0	0	5.7	5.7	I, HE, SE	D, S
<b>Chordata</b>							
Urochordata	10	0.6	0	5.7	6.3	HE, EB	S
Pisces	2	0	0	3.2	3.2	PL	C
<b>Hemichordata</b>							
Enteropneusta	1	0	0	0.7	0.7	I	D
Chaetognatha	3	3.1	14.5	29.5	47.1	PL	C
Phoronida	1	0.6	3.8	24.5	28.9	HE, SE	S
Bryozoa	3	3.1	5.7	20.8	29.6	HE, EB	S
<b>Annelida</b>							
Spionidae	11	23.9	40.3	20.7	84.9	SE, HE	D, H, C, S
Polynoidae	3	1.2	3.1	38.0	42.3	SE, HE	D
Other Polychaeta	28	5.0	18.8	45.3	69.1	I, EB, SE, HE	SC, C, S
Hirudinea	1	0	0	0.7	0.7	PL	P
Platyhelminthes	33	0.6	8.8	55.3	64.7	SE, HE	C, SC, P
Nemertea	1	6.3	0	5.7	12.0	SE, HE, I	C
<b>Mollusca</b>							
Bivalvia	9	22.0	23.9	25.2	71.1	HE, SE, I	D, S
Gastropoda	10	2.5	16.4	42.8	61.7	SE, HE	D, SC, H, C
Sipuncula	1	0	0	2.5	2.5	SE, HE	D
Nematoda	1	0	0	9.4	9.4	SE, HE, EB	D, SC
Rotifera	1	0	0	8.2	8.2	PL	O, H
<b>Cnidaria</b>							
Anthozoa	2	0	0	1.3	1.3	HE	S, C
Scyphozoa	1	0	0	1.9	1.9	PL	S, C
Hydrozoa: <i>Obelia</i>	1	0	1.4	21.4	22.8	HE, EB, PL	S, C
Other Hydrozoa	21	0	0.6	19.5	20.1	HE, EB, PL	S, C
Radiolaria	2	0	0	18.9	18.9	PL	C, O
Foraminifera	3	0.6	2.5	6.3	9.4	EB, HE, SE, PL	C, D, SC
Tintinnida	2	15.7	11.3	16.3	43.3	PL	C, SC
Other ciliata	4	‡	‡	‡	‡		
Dinoflagellata	4	6.7	11.4	9.5	27.6	PL	PP
Diatomacea	128	54.7	20.7	17.6	92.4	SE, HE, PL	PP
Chlorophyta	2	0	0	3.8	3.8	SE, HE	PP
Rhodophyta	2	0	0	1.2	1.2	SE, HE	PP
Zosteraceae	1	0	0	0.7	0.7	SE	PP

\*EB, epibiotic (living on other organisms); HE, hard bottom epifaunal; I, infaunal; PL, planktonic; SE, soft bottom epifaunal. †C, carnivore; D, deposit feeder; H, herbivore; O, omnivore; P, parasite; PP, primary producer; S, suspension feeder; SC, scavenger. ‡Ciliate abundance not estimated.

from J. T. Carlton and J. B. Geller, "Ecological roulette: the global transport of nonindigenous marine organisms," *Science*, 261 78-82 (1993)

The following figure shows the rate of known successful introductions of nonindigenous species into two well-studied areas since the early nineteenth century.<sup>9</sup>



Introductions of nonindigenous aquatic plants and animals in (left) the Great Lakes and (right) the San Francisco Bay region.

The threat to the environment and the economy of ANS introduction via ballast water is well established (see section 2.d.iv), and there is growing concern of the possibility of direct threats to human health from pathogens such as cholera in ballast water that was taken up in foreign ports.<sup>10</sup> Methods to manage ballast water to reduce these threats are undergoing extensive study in this country<sup>11,12</sup> and internationally.<sup>13,14</sup>

**c. Other Pathways for ANS Introductions**

Aquatic nuisance species are introduced by means other than ships. A recent study of ANS in the Great Lakes concluded, as shown in the figure below, that while ships were the most frequent pathway for species introductions, they were by no means the only pathway.<sup>15</sup> While most studies agree that ballast water discharges are the primary source of ANS introductions from vessels, ships can also transport living organisms on the hull, in sea chests, in seawater piping systems, on the rudder, entangled in the anchor or in the anchor chain, in chain lockers or caught up in fishing nets.<sup>16</sup>

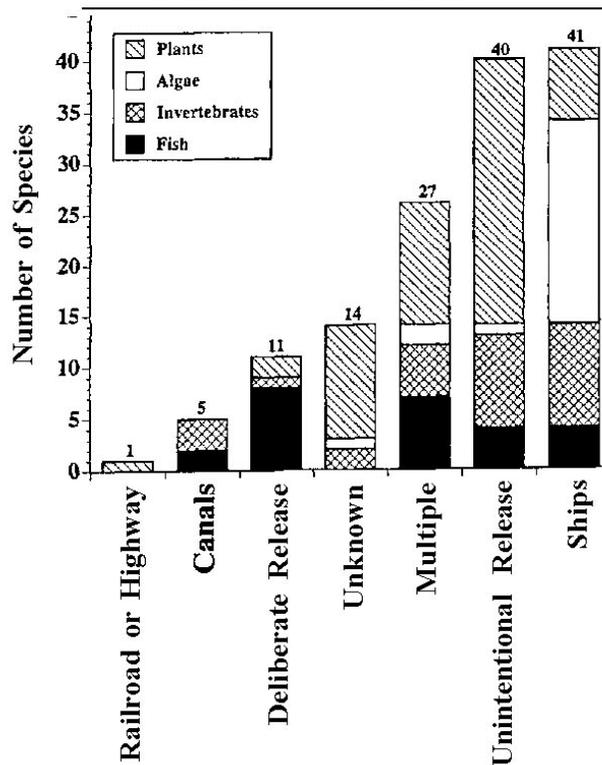


Figure II-2. Entry Mechanism of Aquatic Species Introduced to the Great Lakes (n=139)  
 Sorted by Taxonomic Group [Mills et al, 1993a]

**d. Vessel Traffic Information**

**i. Description of Vessels**

In developing its regulations implementing NISA, the U.S. Coast Guard estimated that approximately 31,000 voyages occur annually from beyond the Exclusive Economic Zone (EEZ)\* into waters of the U.S.<sup>17</sup> This number represents voyages made by U.S.-flagged, international, and recreational vessels.

*U.S.-Flagged vessels.* Nearly 40,000 vessels flew U.S. flags as of 1995.<sup>18</sup> About three-fourths of these were non-self-propelled barges. (Most of these barges do not carry ballast water.) Some of these U.S.-Flagged vessels travel beyond the U.S. EEZ.

*International vessels.* In addition to U.S.-flagged vessels, DOT has estimated that 7520 internationally flagged commercial cargo vessels visited U.S. ports in 1997. These vessels made about 78,000 calls at

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\*The Exclusive Economic Zone (EEZ) is an area of the ocean under national jurisdiction beyond the territorial seas. In the National Invasive Species Act of 1996 (see section 3.a.ii), the EEZ is defined as “the Exclusive Economic Zone of the United States established by Proclamation Number 5030, dated March 10, 1983, and the equivalent zone of Canada.”

U.S. ports in 1997, and passenger vessels made about another 6,000 port calls.<sup>19</sup> (Note: During a single voyage into the U.S., international vessels may call into multiple ports.)

*Recreational vessels.* About 78 million Americans participated in recreational boating in 1997, using 16 million boats of all types, with the number of recreational users expected to grow by over 65 percent to more than 130 million annually in the next 20 years.<sup>20</sup> Some of these U.S.-Flagged vessels travel beyond the U.S. EEZ.

## **ii. Economics of Vessel Commerce**

The following excerpt from a recent Department of Transportation report to Congress provides a picture of the significant place in the U.S. economy held by vessel commerce:

The U.S. Marine Transportation System (MTS) consists of waterways, ports and their intermodal connections, vessels, vehicles, and system users. Each component is a complex system within itself and is closely linked with the other components. It is primarily an aggregation of State, local, or privately owned facilities and private companies. As with the U.S. economy as a whole, decision making and investment are primarily driven by the marketplace. In addition, national, State, and local governments participate in the management, financing, and operation of the MTS.

More than 1,000 harbor channels and 25,000 miles of inland, intracoastal, and coastal waterways in the United States serve over 300 ports, with more than 3,700 terminals that handle passenger and cargo movements. The waterways and ports link to 152,000 miles of rail, 460,000 miles of pipelines, and 45,000 miles of interstate highways. Vessels and vehicles transport goods and people through the system. The MTS also contains shipyards and repair facilities crucial to maritime activity.

As the world's leading maritime and trading nation, the United States relies on an efficient and effective MTS to maintain its role as a global power. The MTS provides American businesses with competitive access to suppliers and markets in an increasingly global economy. The MTS transports people to work; provides them with recreation and vacation opportunities; puts food on their tables; and delivers many of the items they need in their professional and personal lives. Within the United States, the MTS provides a cost-effective means for moving major bulk commodities, such as grain, coal, and petroleum. It is a key element of State and local government economic development and job-creation efforts and the source of profits for private companies. With its vast resources and access, the MTS is an essential element in maintaining economic competitiveness and national security.

Annually, the U.S. marine transportation system:

- Moves more than 2 billion tons of domestic and international freight;
- Imports 3.3 billion barrels of oil to meet U.S. energy demands;
- Transports 134 million passengers by ferry;
- Serves 78 million Americans engaged in recreational boating;
- Hosts more than 5 million cruise ship passengers; and
- Supports 110,000 commercial fishing vessels and recreational fishing that contribute \$111 billion to State economies.

The MTS provides economic value by affording efficient, effective, and dependable all-weather transportation for the movement of people and goods. Waterborne cargo alone contributes more than \$742 billion to U.S. gross domestic product and creates employment for more than 13 million citizens.<sup>21</sup>

## **iii. Potential Costs of Controlling Ballast Water ANS**

Published estimates of the cost of employing ballast water treatment methods vary depending on the source of the estimate, and on the assumptions made, but in general they range from thousands to hundreds of thousands of dollars per vessel.<sup>22</sup> (Section 2.e.iii details some cost estimates for specific control technologies.) If a rough estimated initial cost of \$30,000 per vessel is combined with an equally rough

estimate of 17,500 vessels regulated (about 10,000 domestic and about 7520 foreign-flagged vessels), the initial cost of regulation may be over \$500 million. If a cost analysis shows costs closer to \$100,000 or more per vessel, or if the number of regulated vessels is much larger than 17,500, the costs could exceed a billion dollars. These estimates are in no sense a cost analysis—they are based on reasonable but unsupported assumptions about the number of vessels regulated and on inadequately validated cost estimates. The estimations are included in this report to demonstrate that the possibility of significant costs indicates the need for a thorough cost analysis accompanying any regulatory effort. EPA will explore the full range of options, including any lower cost regulatory approaches that can significantly reduce ANS introductions.

**iv. Potential Costs of Not Controlling Ballast Water ANS**

Invasive species have caused extensive economic damage to the United States. A recent report estimated that over \$5 billion per year in economic damage are caused by ANS.<sup>23</sup> The same report estimated that the costs from non-aquatic invasive species are even greater, due primarily to impacts on U.S. agriculture. Those costs are estimated at over \$100 billion per year.

The ecological damage caused by invasive species can also be enormous. Fully half of all threatened or endangered species are imperiled by invasive species, making it the second greatest cause of endangered species imperilment (second only to habitat loss).<sup>24</sup> In the well-studied San Francisco estuary, the environmental damage attributable to invasive species includes: reduction or local extinction of native species to the extent that some Bay waters now contain virtually no native species; disruption of the aquatic food chain by elimination of phytoplankton by highly efficient invasive filter feeders; erosion of shorelines by invasive burrowers; and other ecosystem alterations which extend to bird and wildlife populations.<sup>25</sup> Coral reef ecosystems in the Florida Keys, Gulf of Mexico and wider Caribbean have been identified as vulnerable to ANS, as a result of heavy ship traffic in the region.<sup>26</sup>

Indigenous or domestic species of economic importance can be driven out, resulting in both ecological and economic loss. The accidental introduction of the Atlantic Coast comb jelly to the Azov and Black Seas shut down the Azov fisheries and nearly eliminated the Black Sea fisheries, at a loss of \$250 million per year.<sup>27</sup>

**e. Ballast Water Management Methods**

A technical challenge facing any effort to set policy regarding ballast water is the fact that there are currently no ballast water management methods that are both universally applicable and proven effective at preventing ANS introductions. While mid-ocean ballast water exchange has been used and is still being used, it presents some safety risks and other limitations which prevent it from being the sole technical solution to the problem of ballast water ANS. Indeed, no single technique can fill this role. The Department of Transportation noted that “It is not appropriate to single out one alternative as ‘the most’ likely or viable—rather, a synthetic approach, choosing a number of alternative simultaneously from a broad menu of possibilities will eventually maximize the strength of ballast management.”<sup>28</sup>

**i. Mid-ocean Exchange**

The most widely accepted method of ballast water management, indeed the only method that can be characterized as currently in common practice, is mid-ocean exchange of ballast water, typically at distances greater than 200 nautical miles from shore, and in water greater than 500 meters deep. Other methods such as ballast water treatment or dockside treatment are used only in special cases, or are currently in the research, development, or demonstration stages. The National Invasive Species Act of 1996 (NISA) (16 USC 4701 et seq.), and the U.S. Coast Guard implementing regulations at 33 CFR 151, require ships entering the Great Lakes from beyond the EEZ to conduct ballast water exchange or an alternative method determined by the U.S. Coast Guard to be “as effective as ballast water exchange.”

However, as a ballast water control strategy, mid-ocean exchange has been only moderately effective in reducing the risk of invasions by nonindigenous species. The success of this management method relies on the physical flushing of organisms entrained in exchanged ballast water with mid-ocean organisms (which presumably are less suited to establishing populations in coastal environments), and with the immersion of any organisms not flushed out during the exchange to saline ocean water (which is presumably less hospitable to most organisms that could establish and flourish in the freshwater Great Lakes). Yet, this method is not completely successful, as demonstrated by the establishment of the tubenose and round gobies, and more recently the water flea *Cercopagis pengoi*, in the Great Lakes during the period where mid-ocean ballast water exchange was mandatory.<sup>29,30</sup> Various studies of ballast water tanks in actual field conditions have found that a 95 percent exchange of the original water resulted in flushing of only 25 to 90 percent of the organisms studied.

Where ballast water is taken up and discharged in saltwater ports, it can be expected that mid-ocean ballast water exchange will be even less successful, because the success of the method will depend on the efficiency of flushing of organisms, and the effect of changes in salinity in the ballast tank will be much less significant. Drawbacks to the mid-ocean exchange method of ballast water management include:

- Many ships are not structurally designed to safely allow ballast water exchange at sea;
- Exchange is sometimes impossible in rough weather due to safety concerns;
- Some organisms can survive under a very wide range of salinity conditions;
- Some ports have salinities very similar to mid-ocean salinities;
- Despite flushing of the ballast tanks with open ocean water, “pockets” of unexchanged water (and entrained organisms) may still remain in nooks and crannies of the ballast tanks;
- Ballast water tanks often contain a layer of sediment, in which organisms can escape being flushed out in a ballast water exchange, to reinoculate the exchanged ballast water;
- The method is unusable by the many ships that travel coastal or inland waterways and never reach the high seas; and
- If mid-ocean exchange does not lead to significant shifts in salinity of ballast water, verification that exchange occurred can be problematic.<sup>31</sup>

## **ii. Special-Case Ballast Water Management Methods**

In addition to mid-ocean exchange, other ballast water management methods have been employed on a limited basis.

### **(1) Shore reception facilities**

Tankers which pick up oil from the Alaska pipeline and deliver it to ports along the west coast typically do not travel routes that take them across mid-ocean, so they cannot engage in mid-ocean ballast water exchange. They normally travel north to Alaska with their cargo tanks full of ballast water, which they discharge to take on their cargo of oil. Tankers picking up crude oil at the Valdez Marine Terminal in Alaska discharge their ballast water to the Alyeska Ballast Water Treatment Facility, which was specifically built to accommodate this water. The entire treatment facility cost \$1.4 billion to build and covers 1,000 acres of land space. The ballast water treatment facility processes about 16 million gallons of ballast water daily. Although the purpose of the facility is to prevent any oil contaminating the ballast water from entering Prince William Sound, it may be that the shoreside treatment has the effect of

removing some hitchhiking organisms as well.<sup>32,33</sup>

A similar situation takes place at some Canadian ports. A survey of Canadian reception facilities for marine wastes in the Great Lakes system listed nine facilities that have the capacity to receive ballast water. In all instances, the fixed reception facilities are petrochemical industries that maintain docking for the transport of their products. The facilities currently handle ballast water from vessels trading with that industry.<sup>34</sup>

It has been suggested that the risk of species invasion may be reduced by greatly expanding this practice of discharging ballast water to shore-based treatment facilities. This approach presents some significant technical and logistical challenges, including the large volume of water this practice would introduce to the treatment facility, the risk of poisoning the treatment facility treatment system with saline water, and the need to develop an extensive infrastructure on ships and at port terminals to direct the ballast water to the treatment facility. The feasibility of shore-based ballast water treatment options has been discussed in reviews of ballast water management technologies,<sup>35,36</sup> and is the subject of ongoing studies funded by the National Oceanic and Atmospheric Administration (NOAA) Seagrass program and EPA's Green Ports program.

## **(2) Chlorine treatment on some passenger vessels**

Some passenger vessels are equipped with systems that generate chlorine in-situ and introduce it into the sea chest, from which engine cooling water is drawn. The purpose of the system is to reduce or eliminate fouling organisms in the seawater used for cooling. On some vessels, ballast water is drawn from this same sea chest, and there is some indication that the chlorine treatment has the serendipitous effect of minimizing living organisms in the ballast tank as well. Congress afforded this ballast water treatment technology the presumption of effectiveness when they exempted from ballast water exchange requirements in NISA, any "passenger vessel equipped with a functioning treatment system designed to kill aquatic organisms in the ballast water," unless it was determined that the system was not as effective as ballast water exchange.<sup>37</sup> However, one potentially significant adverse environmental impact from this treatment technology is the discharge of large amounts of chlorine.

Treatment of ballast water with chlorine for the specific purpose of controlling ANS is one of the developing technologies discussed in section 2.e.iii.

## **iii. Alternative Methods in Research, Development or Demonstration Stages<sup>38,39</sup>**

Research and development projects funded by the U.S. Coast Guard, National Oceanic and Atmospheric Administration, U.S. Fish and Wildlife Service, EPA and other Federal, State and non-governmental organizations are studying other methods of reducing the risk of species invasion in ballast water. EPA-funded projects on treatment technology research and development include:

- Support from EPA's Great Lakes National Program Office (GLNPO) to the Northeast/Midwest Institute for development and demonstration of UV light as an effective secondary treatment tool to be used with filtration to remove the smallest microorganisms as part of the Institute's work on the Great Lakes Ballast Technology Demonstration Project (see section 3.a.ii.(4));
- Cooperation between GLNPO and NOAA's Great Lakes Environmental Research Laboratory on a project examining the risk of invasions associated with so-called "no ballast on board" (NOBOB) vessels, and to guide the development of treatments to better manage NOBOB vessels;
- Small Business Innovative Research grant funding in 2001 for two proposals to develop ballast water treatment technologies;<sup>40</sup>

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- A Green Ports program grant to the California Association of Port Authorities to study the feasibility of shore-based ballast water treatment methods;<sup>41</sup> and
- A Memorandum of Agreement between EPA Office of Research and Development's Environmental Technology Verification (ETV) program and the U.S. Coast Guard, to jointly verify the performance of private sector, commercially available ballast water control technologies.<sup>42</sup>

A 1996 National Research Council report suggested that the ballast water management methods with the most promise were based on filtration, biocides, and thermal treatment.<sup>43</sup> A 1992 Canadian report found the most promising methods to be filtration, UV treatment, and discharge to a shore facility.<sup>44</sup>

The most advanced of these studies deal with installation and operation of a pilot treatment system on a ship. Systems which use waste heat from ship engines to treat ballast water have also been studied on board ships. Australian research on the bulk carrier *Iron Whyalla* demonstrated a kill rate of organisms comparable to the removal rate of ballast water exchange.<sup>45,46</sup> Similar results were observed on trials on the ore carrier *Onde Maru*.<sup>47</sup>

Filtration of ballast water has been the subject of several shipboard studies. Actual ballast water was filtered on board the Great Lakes carrier *Algol North* with a pilot filtration system. The study estimated the cost to implement a fully operational onboard backwash filtration system capable of filtering 4000 cubic meters of ballast water (about 18,000 gallons) an hour at about a million dollars per ship.<sup>48,49</sup> Removal of most aquatic organisms was shown to be effective, and practical problems with the system seem surmountable. Extremely small organisms were not removed, as expected. The possibility that no single treatment technology could remove or inactivate all types of organisms in ballast water has led to predictions in several studies that an effective treatment system would involve a physical separation step supplemented with a second technology targeted towards the organisms missed by the first.<sup>50,51</sup>

In May 2000, a prototype ballast water treatment system which combines a cyclonic separation unit with treatment by UV light, was installed on the cruise ship *Regal Princess*.<sup>52</sup> Test results are expected to be published shortly, but were encouraging enough that Princess Cruise Lines has contracted to install units, with design improvements indicated by prototype results, on two more of its ships which call on California ports.<sup>53</sup>

In May 2001, a pilot project was initiated on the U.S. Maritime Administration cargo vessel *Cape May* which will test a ballast water filtration unit, followed by secondary treatment of ballast water by either UV light or a peroxyacid-based biocide. Test results are expected in the summer or fall of 2001.<sup>54</sup>

A recent report commissioned by the Port of Oakland included a table attributed to the Pacific Merchant Shipping Association, which estimated the costs of installation and use of some ballast water treatment options, once the technology to implement the option is complete.<sup>55</sup> The report estimated that a shipboard filtration system would cost about \$200,000 to install, and \$250,000 annually to operate. The following table is reproduced from that report. Estimated costs are in line with a rough order of magnitude estimate of "\$1000s to \$100,000s per vessel" in the 1992 DOT shipping study mandated by the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990.<sup>56</sup>

In response to its charge to determine the best way to stop introductions of ballast water ANS in twelve months, Michigan's Ballast Water Technical Work Group (discussed in section 3.c.i.(1)) has been studying treatment technologies that are currently available, that may be quickly applied to ballast water. The Work Group concluded that the only currently available methods of improving the control of ballast water ANS were improved management practices and treatment of ballast water with biocides.

The Work Group recognized the additional complications involved with using chemical biocides for ANS control, over nonchemical ANS management methods. These complications include the need to consider

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safety issues associated with the chemicals' use, the environmental effect that discharge of residual biocide or biocide byproducts may cause on receiving waters, and the possibility of corrosion or other damage to the ballast water tank from the use of the biocide. The Work Group designed a shipboard testing program of the three currently available biocides they found most promising: glutaraldehyde, hypochlorite, and copper ion.<sup>57</sup> The testing is planned for the summer 2001 shipping season, and results are expected to be reported to the Council of Great Lakes Governors Task Force (discussed in section 3.c.i.(1)) the following shipping season.

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**Estimated Costs to Vessel operators for Ballast Water Invasive Species Control<sup>58</sup>**

Option	Estimated Cost Breakdown				Comments
	Design	Material Acquisition	Installation	Annual Operating	
<i>Ballast Water Exchange</i>	\$10,000	\$5,000	\$20,000	\$30,000	Exchange ballast in deeper water. Easy method with very little retrofitting required. Could result in stability and structural stress issues.
	Hull penetration analysis, piping re-design	Hull penetration, some piping	Assumed during yard period	Extra overtime may be required for ship with unmanned machinery spaces	Continuous flushing method. Piping modifications for inlet and discharge on ships with common hull penetration
<i>Ballast Water Management</i>	\$15,000	\$15,000 to \$75,000	\$30,000	\$25,000 to \$250,000 depending on water source	Lower probability of foreign species getting into ballast water (high ballast suction, fresh water from port, city water, cleaning ballast tanks more regularly)
	Hull penetration analysis, piping re-design	Hull penetration, some piping, possibly new BW pumps	Assumed during yard period	Potential delays, also, if ballasting is done from/to shore facility	Piping system changes for high suction and shoreside manifold.
<i>Ballast Water Filtration</i>	\$25,000	\$100,000	\$60,000	\$250,000	Filter the intake or discharge (or both) of ballast systems. Feasible, but potentially ineffective if it interferes with the ship's cargo operations or is bypassed by crew.
	Piping re-design, filtering system design	Filters and piping (assume 10" pipe)	Assumed during yard period	High maintenance & repair burden potential delays, waste disposal uncertain	Piping system changes for inlet discharge strainers. Filtered material disposal could be costly and difficult.
<i>Ballast Water Treatment Aboard Ship</i>	\$15,000 to \$25,000, depending on system	\$25,000 to \$150,000, depending on system	\$25,000 to \$75,000, depending on system	\$50,000 to \$1,000,000, depending on system	Chemical and physical treatments on board ship. Problem with discharging chemicals from tanks. Heat treatment is energy intensive. UV light treatment is promising. Difficult to currently approximate costs due to need for R&D.
	Treatment systems design		Assumed during yard period		Heat treatment of large volumes of ballast is cost prohibitive, exceeding \$1,000,000/year. Engine jacket water waste heat cannot be used as it does not have ΔT to raise BW temperature to 50°C.
<i>Shoreside Treatment</i>	\$10,000	\$15,000 to \$75,000	\$15,000 to \$45,000	\$30,000 exclusive of delays	Transfer of ballast to and from a port facility. Requires retrofit of ship to accept connection to shore and requires port facility construction.
	Piping re-design	Piping, new BW pumps, if required	Assumed during yard period	Potential port delays for ballasting	Piping system changes for shoreside manifold. Other than potential delays in port and new larger pumps, this may be the best option for ships.
<i>Vessel Design Changes for Internal Ballast Transfer</i>	\$15,000	\$15,000	\$30,000	\$30,000 to \$1,000,000	Newer larger container ships are less stability sensitive. Some have large SW ballast systems, some do not. Need to load and/or transfer ballast is driven more by factors such as fuel burn-out and shoreside cargo loading plans. Virtually all container ships frequently experience large changes in draft and displacement.
	Piping re-design	Piping	Assumed during yard period	Potential cargo dead weight ton reductions and increased fuel cost for a large system	Piping system changes for container ships to provide capability to transfer ballast from and to any tank.

Source: Pacific Merchant Shipping Association

The following table presents the stage of development of some ballast water treatment technologies.<sup>59,60,61</sup> No technology is undergoing large-scale implementation yet as an alternative to ballast water exchange.

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<b>PROJECT</b>	<b>TECHNOLOGY LEVEL</b>
Ballast exchange–ship efficacy studies	Pilot (shipboard)
Ballast exchange–ship design studies	Requirements for effective exchange
Chlorination	Equipment testing
Electrical discharge + filter	Concept study
Filtration + UV or biocide	Pilot (shipboard)
Filtration + disinfection	Pilot (dockside)
Filtration	Pilot (shipboard)
Glutyaldehyde	Concept study
Heat	Pilot (shipboard)
Hydrocyclone + UV	Pilot (dockside)
Hydrogen Peroxide	Concept study
Magnetic, acoustic	Concept study
Vacuum deaeration	Pilot (dockside)
Oxygen deprivation chemicals	Concept screen
Ozone	Concept study
Risk assessment/ decision support	In practice (limited cases); theoretical development & empirical testing
Shore-side reception and treatment	In practice (limited cases); concept study
Tank coatings	Concept screen
Ultrasound	Concept study
Uptake of 'organism-free' water	Concept study
UV, ozone, bromine	Laboratory study
Various biocides + heat	Laboratory study

### **3.. CURRENT ACTIONS TO ADDRESS ANS**

#### **a. Federal Actions**

##### **i. Executive Order 13112**

On February 3, 1999, President Clinton signed an Executive Order which instructed Federal agencies to:

- Identify their actions which may affect the status of invasive species;
- Use existing programs and authorities to prevent the introduction of invasive species; and
- Refrain from carrying out actions which promote the introduction or spread of invasive species.

The order also established an Invasive Species Council, co-chaired by the Secretaries of Interior, Agriculture and Commerce, with membership including the Administrator of EPA and Secretaries of Defense and Transportation. The Council is charged with:

- overseeing the implementation of the order by Federal agencies;
- developing guidance for Federal agencies and making recommendations for international cooperation; and
- preparing, within 18 months, a national Invasive Species Management Plan.

The Invasive Species Management Plan was finalized on January 18, 2001. While dealing with all aspects of terrestrial and aquatic invasive species prevention and control, it included a discussion of ballast water. The Plan contained a national action plan, in which the following specific actions for the prevention of unintentional introductions were included:

16. Federal agencies will take the following steps to interdict pathways that are recognized as significant sources for the unintentional introduction of invasive species:

- a. By July 2001, NOAA, the Coast Guard, Interior, and EPA will sponsor research to develop new technologies for ballast water management, because the current method of ballast water management--ballast water exchange--is recognized as only an interim measure to address non-native species introductions.
- b. By January 2002, the U.S. Coast Guard will issue standards for approval of ballast water management technologies, because actual deployment of new ballast water technologies on ships is contingent on a standard by which to judge their efficacy.<sup>62</sup>

The Plan is available online at "<http://www.invasivespecies.gov>". Section 2.e.iii discusses some of the Federally sponsored research into ballast water technologies.

##### **ii. National Invasive Species Act of 1996 (NISA)<sup>63</sup>**

In 1996, Congress reauthorized and expanded the Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990 (NANPCA). The new legislation, titled the National Invasive Species Act of 1996 (PL 104-332) (NISA), established a national ballast management program targeted at all U.S. coastal regions, continues the mandatory Great Lakes ballast water management requirements, and expanded invasive species management programs within the Department of Interior and NOAA. The legislation also called for mandatory detailed ballast exchange reporting by all vessels, and authorized a Ballast Technology Demonstration Program, bringing more resources to the search for technological and management practice tools to replace ballast exchange.<sup>64</sup>

NANPCA and NISA are included in Appendix B.

**(1) NISA’s Ballast Water Regulations (33 CFR 151)**

NISA authorized the U.S. Coast Guard to establish regulations and guidelines to control the invasion of aquatic nuisance species in ballast water. The U.S. Coast Guard’s interim final rule was issued on May 17, 1999. The rule provides for:

- Mandatory ballast water exchange (or use of an equally effective technology) for ships entering the Great Lakes from beyond U.S. waters;
- Mandatory ballast water reporting and sampling procedures for most vessels; and
- Voluntary ballast water management guidelines for most vessels, to ensure to the maximum extent practicable that ANS are not discharged into waters of the United States.

At the direction of NISA, the U.S. Coast Guard regulation exempts two classes of vessels from parts of its requirements: oil tankers engaged in coastwise trade, and certain passenger vessels possessing ballast water treatment systems.<sup>65</sup>

NISA gave the U.S. Coast Guard the responsibility to decide whether any proposed ballast water treatment technology is as effective as ballast water exchange in preventing ANS. The U.S. Coast Guard recently published a *Federal Register* notice asking for comments on a proposed outline for approval of alternative ballast water technologies. The notice also asked for comments on how the U.S. Coast Guard could best provide incentives for developing new ballast water technologies.<sup>66</sup>

NISA also required the Secretary of Transportation to report to Congress in this year on the effectiveness of voluntary ballast water exchange management guidelines, and to amend the regulations and guidelines if they are not effective.<sup>67</sup> If the reason they are not effective is inadequate compliance, or if the level of reporting is inadequate to assess the level of compliance, NISA provided the U.S. Coast Guard the authority to make the voluntary guidelines mandatory.<sup>68</sup>

NISA gave the U.S. Coast Guard broad authority to establish procedures that “all vessels equipped with ballast water tanks that operate in waters of the United States”<sup>69</sup> should follow to prevent ANS introductions in ballast water, and the authority to make the procedures mandatory and enforceable, with civil and criminal penalties for noncompliance (\$25,000 per violation per day civil penalties are set; knowing violation is a Class C felony).<sup>70</sup> Despite this broad grant of authority, NISA did limit U.S. Coast Guard action. Except for vessels entering the Great Lakes from beyond the U.S. EEZ, NISA does not authorize the Coast Guard to make its ballast water management guidelines mandatory until it has reported to Congress on the effectiveness of its program.

The U.S. Coast Guard has long had a program in place to disseminate information on ANS, and on methods to reduce or prevent their spread in ballast water, and to encourage compliance with the previous ballast water management requirements and guidelines under 33 CFR 151. With the modification of 33 CFR 151 to implement NISA, the U.S. Coast Guard is adapting its program to the new regulations.

The Commandant of the U.S. Coast Guard recently affirmed the Coast Guard’s commitment to control of ballast water ANS by writing that “establishing a regime that effectively and efficiently addresses the introduction and transfers of potentially harmful aquatic organisms via ballast water is my highest marine environmental protection priority.”<sup>71</sup>

**(2) National Ballast Water Clearinghouse**

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The U.S. Coast Guard was directed by NISA to develop a National Ballast Water Information Clearinghouse in conjunction with the Smithsonian Environmental Research Center (SERC). This national database, located at SERC, plays a central role in the management and analysis of data on the transfer and invasion of nonindigenous species associated with ballast water, including compilation of the ballast water management reporting forms required of ships by 33 CFR 151.

The first annual report of the Clearinghouse included a description of the Clearinghouse's function of collecting data on national ballast water management practices, in the form a "National Ballast Survey":

A key element of NISA involves tracking the effectiveness of voluntary guidelines, as measured by (a) the level of compliance with voluntary guidelines, (b) changes in the rate and patterns of ballast water delivery, and (c) reduction in the rate of ballast-mediated invasions. The Clearinghouse was created to provide these analyses on a national scale. The Clearinghouse and the USCG have implemented a nationwide program, the National Ballast Survey (NABS), to measure ballast water management and delivery patterns for commercial vessels that arrive to U.S. ports from outside the nation's EEZ.

The NABS was designed explicitly to create a national database on ballast water to be used to measure: (1) Rates of compliance with the ballast water reporting requirement; (2) Rates of compliance with the voluntary management guidelines for holding or exchanging ballast water; (3) Patterns of ballast water delivery and management (including exchange) according to vessel class for geographic region and season of arrival; (4) Among-year changes in ballast water management by vessel class and geographic region; and (5) Accuracy of data through use of multiple, independent data sources.

The NABS currently relies on three primary sources of data. These include:

1. Ballast water information reported directly to the Clearinghouse by arriving vessels;
2. Foreign waterborne Transportation statistics collected by the U.S. Customs Service and the U.S. Army Corps. of Engineers. These data on vessel arrivals to U.S. ports are compiled by the Department of Transportation's Maritime Administration (MARAD);
3. Verification surveys of vessels, arriving from outside the EEZ, that are conducted nationwide by the USCG.<sup>72</sup>

The report found a low level of compliance with mandatory reporting of ballast water management practices: Only 20.8% of arrivals subject to the reporting requirement submitted reports in the first 12 months of the regulatory program.

With such a low reporting rate, it was difficult to estimate the overall level of compliance with ballast water management guidelines. The report found that, of all ships that submitted reports:

- 70.7% indicated no intention to discharge ballast water within U.S. territory;
- 14.1% declared no exchange of ballast water prior to discharge;
- 8.9% declared partial exchange of ballast water prior to discharge; and
- 6.3% declared complete exchange of ballast water prior to discharge.

The report concluded, "Vast improvements in both reporting compliance by ships and implementation of the U.S. Coast Guard Verification Surveys are required to characterize compliance with the voluntary guidelines as requested under NISA. Without improved reporting, we cannot estimate nationwide compliance from submitted information and must rely on U.S. Coast Guard Verification Surveys, which remain inadequate for this purpose."<sup>73</sup> As discussed in section 3.a.ii.(1), NISA provided the U.S. Coast

Guard the authority to make voluntary requirements mandatory if the level of reporting was inadequate to allow compliance to be assessed.

**(3) Aquatic Nuisance Species Task Force (ANSTF)**

Established under NISA, the ANSTF is an interagency group responsible for coordinating governmental efforts related to ANS in the United States with those of the private sector and other North American interests.<sup>74</sup> The ANSTF is chartered under the Federal Advisory Committee Act.<sup>75</sup> Recently the ANSTF drafted a resolution which committed the body to “eliminate, as soon as possible, ships’ ballast water as a significant pathway for the introduction of invasive species into American waters.”<sup>76</sup>

The role of the ANSTF in approving State ANS Management Plans is discussed in section 3.c.i.

EPA has been represented on the ANSTF since its inception. EPA also has representatives on the Ballast Water and Shipping Committee of the ANSTF, which works closely with the U.S. Coast Guard to help identify alternative ballast water management technologies and gauge their effectiveness. EPA is also a member of the Ballast Water Program Effectiveness and Adequacy Criteria Committee, which provides to the ANSTF, to be forwarded to the U.S. Coast Guard, recommended criteria for assessing whether the requirements and guidelines implemented by the U.S. Coast Guard program are effective at reducing the risk of species invasion.

**(4) Ballast Technology Demonstration Program**

Section 1104 of NISA instructed the Secretary of the Interior and the Secretary of Commerce, with the concurrence of, and in cooperation with, the Secretary of Transportation, to undertake a demonstration of technologies and practices which may prevent introduction and spread of nonindigenous species through ballast discharge. The demonstration program was authorized at \$2.5 million over 3 years. NISA directed that technologies and practices identified as promising in the 1996 National Research Council study (discussed in section 2.e.iii) be given priority.<sup>77</sup>

**(5) Environmental Protection Agency’s Role under NISA**

The primary agents of the Executive Branch charged with implementing NISA were the U.S. Coast Guard, the Secretary of the Department in which the Coast Guard is operating (the Secretary of Transportation, in peacetime), and the Aquatic Nuisance Species Task Force. EPA also has some explicit responsibilities under NISA. They include:

- Participating on the Aquatic Nuisance Species Task Force,<sup>78</sup> and
- Providing, in cooperation with the National Science Foundation and the Task Force, competitive research grants for projects that identify environmentally sound methods for controlling the dispersal of aquatic nuisance species.<sup>79</sup>

**iii. Act to Prevent Pollution from Ships (APPS)<sup>80</sup>**

This statute is the U.S. implementation of several Annexes to the MARPOL (also known as “the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978” or “MARPOL 73/78”). Regulations implementing APPS are promulgated and enforced by the U.S. Coast Guard. APPS applies to all U.S. flag ships anywhere in the world, and to all foreign flag vessels operating in the navigable waters of the United States or while at a port or terminal under the jurisdiction of the United States. APPS’s regulations limit discharges of substances covered by MARPOL, establish report requirements for discharges, and establish specific requirements for monitoring equipment and record-keeping aboard vessels. Ballast water is currently not covered by MARPOL (unless it is contaminated with

oil or other substances covered by MARPOL), or by APPS.

**iv. Current Activities Under the Clean Water Act (CWA)<sup>81</sup>**

**(1) Section 303**

Section 303(c) of the Clean Water Act requires States to consider the use and value of State waters for public water supplies, propagation of fish and wildlife, recreational purposes, and agricultural, industrial and other purpose, when adopting or revising water quality standards.<sup>82</sup> Under §303(d), States must list waters “for which the effluent limitations ... are not stringent enough to implement any water quality standard applicable to such waters.”<sup>83</sup> and list the sources of impairment of those waters. State waters extend three miles. In the current State list, 26 water bodies in five States (California, Iowa, North Dakota, Idaho, Oklahoma) are listed as impaired from “exotic species,” “exotic plant species,” “exotic vegetation,” or specific nonindigenous plants such as Eurasian Watermilfoil. Over 800 waters are listed as impaired from “noxious aquatic plants.” Whether these noxious plants are alien or native was not specified.

The California State Water Resources Control Board and the San Francisco Bay Regional Water Quality Control Board have listed waters of San Francisco Bay as impaired by exotic species as a high priority for TMDL development.

EPA has not previously issued any national regulation or guidance of general applicability that would require an NPDES permit for discharges associated with ballast water. Furthermore, EPA has not made any determination under 33 USC 1342(a)(2) about the suitability of TMDLs for exotic species in ballast water.<sup>84</sup> However, in its response to the Water Quality Control board, EPA stated its strong support for the State’s emphasis on protecting the Bay ecosystem from the effects of exotic species, including its development of TMDLs for exotic species.<sup>85</sup>

**(2) Section 311**

Section 311 of the Clean Water Act prohibits the discharge of oil or hazardous substances, in such quantities as may be harmful, into or upon: U.S. navigable waters, adjoining shorelines, waters of the contiguous zone, and in certain other waters in connection with activities that may affect natural resources. The discharge of ballast water into these waters is prohibited if it contains a harmful quantity of oil or a CWA section 311 hazardous substance. Oil discharges are generally considered to be harmful if they violate a water quality standard or cause a film, sheen, discoloration, sludge or emulsion. However, the discharge of oil is not considered harmful in some circumstances, such as when it is permitted under MARPOL 73/78, Annex I, as provided in 33 CFR 151, Subpart A.

**(3) Section 312**

EPA and the Department of Defense recently promulgated regulations under CWA 312(n) which identify ballast water and other discharges specifically from Armed Forces vessels as subject to enforceable discharge standards.<sup>86</sup> Note that the CWA definition of “pollutant” was amended in 1996 to exclude Armed Forces vessel discharges covered under Section 312(n).<sup>87</sup> This means that rather than being subject to NPDES permit requirements, the 312(n) standards are directly applicable to Armed Forces vessels.

**v. Other Federal Laws**

Appendix B discusses other laws with possible application to ballast water, including the National Environmental Policy Act (NEPA) and the Endangered Species Act (ESA).

**b. International Actions**

**i. Foreign Laws**

Several countries that have had particular problems with ballast water ANS have taken action to minimize or prevent the introduction of other species in the future. The following table briefly summarizes several other countries' programs to control ballast waters discharges.<sup>88</sup>

<b>Country</b>	<b>Ballast Water Rules</b>
Australia	As of July 2001, Australia requires mandatory ballast water management arrangements for all international vessels arriving in Australian ports or waters. The arrangements incorporate a decision support system which provides vessels with a risk assessment of the ballast water for introductions of ANS, establishes a ballast water reporting system, and verification inspections. <sup>89</sup>
Bonaire	Prohibits dumping of ballast water in its coastal waters <sup>90</sup>
Canada	The Canada Shipping Act was revised on Oct 31, 1998 to authorize regulations respecting the control and management of ballast water. These regulations have not yet been written. <sup>91</sup>
Israel	All ships destined for Israeli ports must exchange any ballast water in open seas, beyond any continental shelf or fresh water current effect. Ships visiting Eilat must exchange outside the Red Sea and ships visiting the Mediterranean ports must exchange in the Atlantic.
Chile	Mandatory requirements on ballast water were introduced in 1995. Any ship coming from zones affected by cholera or similar contagious epidemic should renew ballast water at least 12 nautical miles from coast. Where no proof of ballast water exchange is available, chemicals (powdered sodium hypochlorite or powdered calcium hypochlorite) must be added to ballast water prior to deballasting in port.
Panama Canal	Discharges of any kind are prohibited in the Panama Canal.
Argentina	Since the early 1990s, Buenos Aires port authorities require chlorination of ballast water for ships calling at the port. Chlorine is added to ballast water via the ventilation tubes of ballast tanks.
New Zealand	Voluntary guidelines have been in place since 1992. Vessels should provide (1) evidence of origin of ballast water, and certification that it is free from toxic dinoflagellates, (2) evidence of ballast water exchange at sea, or (3) evidence that ballast water has been disinfected.

**ii. International Agreements**

**(1) International Maritime Organization (IMO)**

In 1997, the IMO adopted voluntary ballast water management guidelines to minimize the transfer of harmful aquatic organisms and pathogens. Members of the Ballast Water Working Group of the Marine

Environmental Protection Committee (MEPC) of the IMO are now attempting to draft an international agreement that would make mandatory the management of ballast water discharges. EPA actively participates as a member of the U.S. delegation in the preparations for, and the negotiations during, the meetings of the Ballast Water Working Group of the Marine Environmental Protection Committee of the IMO. In April 2001 the MEPC considered a draft text of an international ballast water instrument drafted by the United States. The U.S. draft was accepted by the MEPC as the base document for further development of the treaty. In addition, over the next year, the U.S. is coordinating an international correspondence group to help develop an effective international standard. The U.S. has taken on this role to chair an intercessional standards drafting group, because the U.S. believes that development of an effective international standard is necessary for, and should be the basis of, this agreement. The United States will need to address to what extent, if any, the international agreement would limit what it and individual States can do to regulate ballast water discharges in their jurisdictions. U.S. domestic implementation of this instrument is expected to be accomplished through existing domestic legislation.

### **(2) International Joint Commission (IJC)**

The 1909 Boundary Waters Treaty established the IJC to assist the governments of the United States and Canada in finding solutions to problems in the rivers and lakes that lie along, or flow across, their common border. The problem of ANS has been recognized by the IJC since at least 1988, when they called upon the Canadian and United States to respond to the discovery of the ruffe and the zebra mussel in the Great Lakes.<sup>92</sup>

In May 2000, the Water Quality Board of the IJC released a report which singled out ballast water discharges as the most important source for ANS entering the Great Lakes basin. The report recommends the following to the Canadian and United States governments:

- Development of binational ballast water discharge standards, to be enforced on all ships in the Great Lakes basin;
- Investment in resources directed to ballast water treatment technology development;
- Adoption of short-term emergency ballast water treatment measures, such as use of chemical biocides, until long-term treatment technologies are developed;
- Implementation of a program to publicly recognize the efforts of shippers entering the Great Lakes basin that engage in best management practices for ballast tank sediment control;
- Encouragement of vessel design modifications as appropriate for existing and new vessels, as a means of facilitating ballast water exchange on the open seas, and the effectiveness of other measures being considered; and
- Development and implementation of effective contingency plans for responding to (i) the accidental discharge of untreated ballast water resulting from a collision or grounding of a vessel in the Great Lakes basin; (ii) the initial discovery of a new ANS in the Great Lakes basin ecosystem; and (iii) the discovery of an ANS in a region previously thought to be free of such organisms.<sup>93</sup>

### **(3) Other Treaties and Agreements <sup>94</sup>**

- The General Agreement on Tariffs and Trade (GATT) in which Article XX(b) acknowledged the need for parties to protect themselves from harmful ANS. This article legitimized trade restraints, such as quarantine regulations, that are necessary to protect the life or health of humans, animals, or plants.

- The International Plant Protection Convention (1972), covered agricultural pests.
- The International Convention on Biological Diversity (signed in 1993, but not yet ratified by the U.S. Senate) contains a provision to control, eradicate, or prevent the introduction of those alien species that threaten ecosystems, habitats, or species.
- The United Nations Convention on the Law of the Sea (UNCLOS) is the sole multinational convention with provisions specific to marine introductions. (In 1994, UNCLOS came into force provisionally; the U.S. has signed, but not ratified, this agreement.) In particular, Article 196, paragraph 1 states:

“States shall take all measures necessary to prevent, reduce and control pollution of the marine environment resulting from the use of technologies under their jurisdiction or control, or the intentional or accidental introduction of species, alien or new, to a particular part of the marine environment, which may cause significant and harmful changes thereto.”  
(Emphasis added)
- The United Nations Conference on Environment and Development (UNCED 1992) (a.k.a. “Agenda 21”) is entitled “Protection of the Oceans, All Kinds of Seas, Including Enclosed and Semi-enclosed Seas, and Coastal Areas and The Protection, Rational Use and Development of Their Living Resources.” Section 17.30(a)(vi) of this agreement considers “the adoption of appropriate rules on ballast water discharge to prevent the spread of non-indigenous organisms.”
- Section 11.64 of the Convention on International Trade in Endangered Species of Wild Fauna & Flora (CITES) primarily addresses trade in alien species; however, it recognizes the threat alien species pose to biodiversity, and the need for a synergistic association between this agreement and the International Convention on Biological Diversity.

**c. State And Regional Programs**

**i. State ANS Management Plans**

NISA directed States to develop ANS Management Plans. NISA provides the opportunity for Federal cost-share support for a Plan’s implementation once it is approved by the ANS Task Force. NISA requires that each Plan:

- Identify and describe State and local programs to prevent and control ANS;
- Identify Federal activities that may be needed to prevent and control ANS, and describe the manner in which those activities should be coordinated with State and local government activities;
- Identify any authority that the State does not have at the time of the development of the plan that may be necessary for the State to protect public health, property, and the environment from harm by ANS; and
- Have a schedule of implementing the plan, including a schedule of annual objectives, and enabling legislation.<sup>95</sup>

The following States and regions have approved ANS Management Plans:

- |            |  |
|------------|--|
| • Iowa     | • Ohio                                       |
| • Illinois | • Washington                                 |
| • Michigan | • St. Croix National Scenic Riverway (MN/WI) |
| • New York | • Lake Champlain Basin (VT/NY).              |

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States and regions in various stages of preparing ANS Management Plans include:

- Alaska
- California
- Florida
- Hawaii
- Massachusetts
- Minnesota
- Missouri
- Oregon
- South Carolina,
- Wisconsin,
- Chesapeake Bay (MD/VA/PA/WV/NY)
- Colorado River Basin (AZ/CO/NM/WY/NV).

The Plans of a few active States are discussed briefly below.

**(1) Michigan**

Michigan was one of the first States to complete an ANS Management Plan. Michigan's Plan calls for information and education, impact assessment, monitoring, research, regulation and policy development. The Plan details these objectives and specifies activities for achieving them. The Plan also provides the framework for a long-term commitment by the State to combat ANS. The Plan does not advocate the development or adoption of specific new laws or regulations, nor does it specify modifications to existing controls.

Although essentially a plan for State action, Michigan's Plan recognizes the importance of a global approach to ballast water control:

Long-term strategies for effectively eliminating the risk of intercontinental transfers of harmful organisms by shipping will require a coordinated regional approach, possibly a global one. Examination of ships and their discharges, new and continued research and development, and implementation of existing and anticipated measures will necessitate coordination worldwide if programs are to be as effective as they could be at preventing introductions of harmful organisms.<sup>96</sup>

The plan also notes the value of cooperation with shippers, and of a balanced approach employing both regulatory and voluntary elements:

Similarly the cooperation of shippers and ships' crews should be actively recruited wherever possible in order to maximize the effectiveness of preventive programs. Keys to shipping industry cooperation are an understanding of the problem, reasonable-cost preventive procedures, and positive feedback to cooperators. Preventive programs should be as effective and environmentally safe as possible. Although regulations may or may not be necessary or desirable in the short term or in certain circumstances, resource managers should seek legislative authority which would permit rapid action as necessary. Comprehensive regulations will almost certainly be needed eventually in order to implement long-term solutions and to help ensure responses that are consistent with the magnitude of the problem.

An excellent example of cooperative efforts was the adoption of voluntary ballast water management guidelines by the maritime industry to control the range expansion of the ruffe from Duluth Harbor, Minnesota. Support of the guidelines came from the Lake Carriers' Association, U.S. Great Lakes Shipping Association, Seaway Port Authority of Duluth, Thunder Bay Harbor Commission, Canadian Shipowners Association, and the Shipping Federation of Canada. The guidelines demonstrate that owners and operators of vessels in the domestic and international trade on the Great Lakes recognize their role in assisting the governments of United States and Canada in controlling the introduction and spread of nonindigenous species.<sup>97</sup>

As part of Michigan's plan implementation, the Governor of Michigan recently requested that a task force be established under the Council of Great Lakes Governors. The purpose of the task force is to explore, outline and advise the Great Lakes Governors on a range of options to inhibit the further introduction of ANS from ballast water. The Governor also expressed his wish to enhance protection efforts by addressing ships reporting "no ballast on board" (NOBOBs) under the current federal regulatory regime. These vessels are not subject to the high-seas ballast water exchange program pursuant to federal law yet contain a large amount of residual sediment that may harbor ANS.

In response to the Governor's request, the Michigan Department of Environmental Quality convened in April

2001 a Work Group of technical experts from international and lake carriers and the U.S. Coast Guard to examine potential ballast water treatment options. The goal statement of the workgroup is to prevent future introductions via ballast water within twelve months. The Ballast Water Technical Work Group will advise the Council of Great Lakes Governor's task force.<sup>98</sup>

**(2) Washington**

Washington's ANS Management Plan has the goal to fully implement a coordinated strategy that will:

- Minimize the risk of further ANS introductions into Washington waters through all known pathways;
- Where practical, stop the spread of ANS already present; and
- Eradicate or control ANS to a minimal level of impact, by the year 2002.

The Plan is focused on the identification of feasible, cost-effective management practices to be implemented in partnership with tribes, private, and public interests for the environmentally sound prevention and control of ANS.<sup>99</sup>

**ii. Historical State Laws and Regulations**

Many States have long had laws or regulations governing management of ballast water. Historically, most of these laws and regulations were designed to prevent discharge of oil from tanks that hold both fuel or cargo oil and ballast water. Some, such as California and Illinois, explicitly excluded segregated ballast tanks (tanks which are dedicated to ballast water and never hold oil) from their regulations. Some, such as Virginia, excluded all ballast water discharges from certain regulations that prevent the discharge of chemicals. Appendix A contains excerpts from some of these laws and regulations.

**iii. Recent State Laws to Address Ballast Water ANS**

**(1) California**

On October 8, 1999, the Governor of California signed Assembly Bill 703, which deals specifically with the problem of ballast water ANS. The bill references the Porter-Cologne Water Quality Control Act, under which the State Water Resources Control Board and the California Regional Water Quality Control Boards are the principal State agencies with regulatory authority for water quality.

The bill does not specify ballast water treatment technologies, discharge standards, or specific ballast water permitting requirements, but instead charges the Regional Water Quality Control Boards to develop these requirements and permitting procedures. The Bill, however, does require in the short-term mandatory ballast exchange or equivalent treatment, and in the long-term, updated treatment technologies phased in as they become economically and technologically achievable. The bill also requires ships to prepare ballast water management plans, and to report ballast water discharges using the U.S. Coast Guard reporting form. The bill took effect on January 1, 2000. Assembly Bill 703 is included in Appendix A.

**(2) Washington**

On February 14, 2000, the Washington Senate unanimously passed Substitute Bill 6293, "An act relating to ballast water management; adding a new chapter to Title 75 RCW; and prescribing penalties." The bill, which drew upon the California Bill, NISA, and NISA's regulations, calls upon the Washington Department of Natural Resources to establish discharge standards for ballast water, which "where practical and

appropriate, ... shall be compatible with standards set by the United States Coast Guard and shall be developed in consultation with Federal and State agencies to ensure consistency with the Federal Clean Water Act.”

After July 1, 2002, ballast water discharges from a vessel are only authorized if the water has been exchanged, or if the ballast water meets State standards. The bill also requires reporting of ballast water discharges using U.S. Coast Guard-acceptable forms, and directs the Department to work with the private sector and Federal and State agencies on a project to establish a ballast water treatment operation that is capable of servicing vessels at all Washington ports. Substitute Bill 6293 is included in Appendix A.

**(3) Maryland**

On May 11, 2000, the Governor of Maryland signed into law (Chapter 473) House Bill 1305, “Ballast Water Management - Reporting and Prohibition.” The law took effect October 1, 2000, and requires the reporting of ballast water management activities by all vessels entering Maryland waters. In contrast, the U.S. Coast Guard requires reporting by ships arriving from beyond the EEZ, and only at the first port of call, in their regulations implementing NISA (discussed in section 3.a.ii.(1)). The bill also calls for the adoption of Federal ballast water management guidelines, and establishment of consistent State guidelines for vessels not covered by the Federal guidelines. The bill also calls for cooperation between Maryland and the U.S. Coast Guard and the States of Virginia, Pennsylvania, and Delaware in the development and implementation of uniform standards for ballast water management, but places no time limits on this development or implementation. House Bill 1305 is included in Appendix A.

**(4) Virginia**

The General Assembly of Virginia approved on March 19, 2001, an act to amend the Code of Virginia by adding into Chapter 1 of Title 28.2 language relating to ballast water management. The language, included in Appendix A, establishes the same ballast water treatment and reporting requirements on ships entering Virginia waters from beyond the EEZ that are required for ships entering the Great Lakes from beyond the EEZ by U.S. Coast Guard regulations (discussed in section 3.a.ii.(1)).

**(5) State Bills Introduced**

Bills on the regulation of ballast water have been recently introduced in several other State legislatures, including Hawaii (HB 1164), Illinois (SB 25), Michigan (SB 955), New York (AO 2334), and Oregon (SB 895). A common feature of bills introduced in Great Lakes States is language requiring stricter controls on ballast water management than the U.S. Coast Guard regulations require. This language, from Michigan Senate Bill 955, is typical of the Great Lakes States’ bills:

“SEC. 3109C. (1) A Person shall not operate a vessel on the waters of the State that contains ballast water that was acquired outside of the waters of the State unless the ballast water and any sediments have been sterilized as required by the Department.”<sup>100</sup>

**d. Local programs<sup>101</sup>**

**i. Humboldt Bay Harbor, Recreation and Conservation District, California**

The Humboldt Bay Harbor, Recreation and Conservation District adopted a resolution in 1996 that established ballast water management requirements for all vessels entering the Bay. The resolution states:

All vessels entering Humboldt Bay with ballast originating from a foreign port shall perform a mid-ocean exchange of ballast with due regard for the safety of the vessel. This shall be accomplished by voiding each ballast tank and refilling each ballast tank with mid-ocean water.

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A “foreign port” as defined here shall include any port except those located on the west coast of North America.

If the Master deems the situation not safe for voiding tanks due to weather conditions or hull stress parameters, he may partially empty tanks, fill with mid-ocean water, and continue pumping through the overflow or vent until full exchange is reasonably assured.

The Master shall keep a record of all ballasting activities and file a statement of such activities with the Humboldt Bay Harbor, Recreation and Conservation District of its designee upon arrival in Humboldt Bay.

**ii. Port of Oakland, California**

In Oakland, port expansion necessitated a study of the environmental impact of increasing vessel calls and the resultant increase in the volume of ballast water discharged into the waters of the San Francisco Bay. The Board of Port Commissioners established Tariff No. 2-a to address the need to find mitigation for the impact of their expanded facilities. The tariff provisions, summarized below, were adopted in June of 1999, with an effective date of August 1, 1999.

General requirements: No vessel using Port terminal facilities shall discharge water ballast from the vessel into San Francisco Bay or the Gulf of the Farallones National Marine Sanctuary offshore of San Francisco Bay, including open waters within the Port Area of the City of Oakland, unless the vessel immediately before arrival in the San Francisco Bay has carried out an ocean ballast water exchange to limit the possibility of transferring non-indigenous species into San Francisco Bay. Exchange shall occur in the oceans westerly of the western boundaries of established marine sanctuaries adjacent to the West Coast of California.

Exceptions to the general requirements:

- Vessels arriving from ports located between the southern boundary of Baja California and the northern boundary of Alaska, if the ballast water to be discharged originated from those waters.
- Vessels providing proof of compliance with International Maritime Organization (IMO) Resolution A774(18) (Guidelines for Preventing the Introduction of Unwanted Aquatic Organisms and Pathogens from Ships’ Ballast Water and Sediment Discharges);
- Vessels on which ocean exchange was not made because of stress of weather or stability or hull stress concerns.<sup>102</sup>

**iii. Ports of Los Angeles and Long Beach, California**

The Ports of Los Angeles and Long Beach do not currently have an established program to control the introduction of ballast water ANS. These ports do, however, have a policy of encouraging their customers to comply with the U.S. Coast Guard’s (voluntary) exchange guidelines.

## **NONREGULATORY APPROACHES TO BALLAST WATER CONTROL**

### **e. Support the U.S. Coast Guard's Ballast Water Regulation Program**

As discussed in section 3.a.ii.(1), the U.S. Coast Guard has had a program in place to encourage compliance with the previous ballast water management requirements and guidelines under 33 CFR 151. With the modification of 33 CFR 151 to implement NISA, the U.S. Coast Guard is adapting its program to the new regulations. If an international agreement on ballast water is implemented domestically by APPS, the U.S. Coast Guard will presumably adapt its program to encourage compliance with APPS as well.

The U.S. Coast Guard has recognized that the success of its ballast water regulations depends not just on the efficiency and completeness of enforcement efforts, but on the regulated community's awareness of the problem posed by ballast water ANS, and acceptance of the measures in place to combat this problem. For this reason, the foremost effort of the U.S. Coast Guard's ballast water program is educating the maritime community of the impacts of ANS and the need for control.<sup>103</sup>

Other elements of the U.S. Coast Guard's program include collection of information gathered on ballast water management practices, research and development of new ballast water management technologies, and coordination with the International Maritime Organization and other organizations working toward control of species invasion in ballast water.

EPA has the experience and infrastructure to contribute substantially to U.S. Coast Guard's education and outreach, research and development, and coordination efforts (e.g., working with States and Tribes).

### **f. Establish a National Voluntary Partnership that Emphasizes Environmental Management Systems (EMS) Approaches to Controlling Ballast Water ANS**

Building on existing programs and other partnerships with Ports, shippers, and key States like Michigan and California, EPA could work with the U.S. Coast Guard and other agencies to form a broad-based partnership to address all significant causes of ANS from ships.

This partnership could include representation from leading Federal agencies, States, industry representatives, and non-governmental organizations. Its primary objective would be to foster the adoption of best management practices, through EMSs, that would address a broad range of possible pathways for the introduction of ANS from ships and other sources. The Partnership would concentrate its efforts on developing tools that could be used by organizations that voluntarily chose to participate. Each organization would adopt Best Management Practices (BMPs) through an EMS designed to address the most significant threat to waters from the introduction of ANS, and share information on the performance of the BMPs and other aspects of its EMS with the public. (BMPs are discussed further in section 3.i.) Initial funding and support for the Partnership could be provided by participating agencies and/or leading industry associations.

This approach would be generally modeled on the National Biosolids Partnership (NBP). The NBP was formed to complement the existing biosolids regulations and to address the very serious public acceptance problems many POTWs were facing when trying to land dispose of their biosolids. A primary goal of the NBP was the development of methodologies and other tools to assist POTWs in complying with regulatory requirements and performing beyond those requirements. To help facilities adopt EMSs for their particular biosolids programs, the NBP has developed or is developing:

- A Code of Good Practice which lays out aspirational goals for facilities to aim for;
- A National Manual of Good Practice which compiles a number of existing biosolids management practices and gives facilities guidance on which practices are most appropriate for a given biosolids

disposal method (i.e., land application, incineration, etc.);

- A set of Common Procedures for facilities to use when establishing their EMSs and accompanying EMS guidance. These are quite similar to the elements of the ISO 14001 Voluntary International Standard for EMSs; and
- A system for qualified third parties (i.e., auditors) to certify that the EMS is operating effectively as a way to increase public confidence.

All of this is being done through a consensus approach involving POTWs, contractors, regulators (State and Federal), and others. It is not intended to supplant existing biosolids regulations.

Compliance with applicable regulations is a must for an effective EMS, but the EMS is intended to go further. Its real goal is to identify and, over time, reduce impacts from a full range of environmental insults to all media.

This last point is relevant to the ballast water issue. There are undoubtedly a number of ways for ANS to get into waterways, not just through ballast water. The ANS problem should be addressed comprehensively; just focusing on ballast water may be short-sighted.

EPA believes this approach is preferable as a first step because it facilitates the development of a technologies. It is very important to note that while this approach has been listed as a “non-regulatory approach” it could also be used to supplement a regulation change to bring ballast water discharges into the NPDES program. In fact, the Voluntary Partnership may lay the ground work for the regulation change and it is likely to enhance the effectiveness of those regulations.

**g. Support Other ANS Programs**

**i. Aquatic Nuisance Species Task Force (ANSTF)**

As discussed in section 3.a.ii.(3), EPA sits on the Aquatic Nuisance Species Task Force, and on the ANSTF’s regional panels, the Ballast Water and Shipping Committee, and the Ballast Water Treatment Effectiveness and Criteria Committee. The Task Force works closely with States, regional bodies, and the U.S. Coast Guard, and active participation on the Task Force and its panels and committees continues to be an effective way to maximize EPA’s contribution to resolving the ANS problem.

**ii. Invasive Species Council**

EPA also sits on the Invasive Species Council, and was active in the preparation of the National Invasive Species Management Plan described in section 3.a.i. EPA supports the Council in the implementation of the National Invasive Species Management Plan’s recommendations.

**iii. Interagency Committee on the Marine Transportation System**

An interagency workgroup led by DOT and including EPA was established to address the problems that threaten the ability of U.S. ports, waterways, and intermodal connectors to remain safe, environmentally sound, and competitive into the next century. A National Marine Transportation System Conference brought together high-level government and nongovernment representatives in November, who identified issues and recommended actions. Ballast water ANS was identified as a major environmental issue. The conference supported ballast water regulations under U.S. Coast Guard lead and recommended further research.<sup>104</sup>

**iv. National Estuary Program (NEP)**

Nonindigenous species invasion has been recognized by the National Estuary Program as a serious concern. In Congressional testimony on July 13, 1999, Deputy Assistant Administrator for Water Dana Minerva listed introduction of invasive species as one of the seven most common problems affecting the 28 estuaries in the NEP. Nine of the 28 National Estuary Programs have identified introduced species as a high or medium priority, and many NEP Comprehensive Conservation and Management Plans include measures to prevent or mitigate damage from invasive species.

**v. Coral Reef Task Force**

The interagency Water and Air Quality Working Group of the Coral Reef Task Force has recognized that the discharge of ballast water at coral reef sites may be harmful to reef ecosystems, and that the introduction of ANS may be one aspect of this harm. They have recommended that the U.S. Coast Guard consider the impacts of ballast water management on coral reefs when preparing their regulations to implement NISA.

**vi. Voluntary Partnership with Ports**

As part of the “Green Ports” program, EPA has worked with the American Association of Port Authorities, the Urban Harbors Institute, and the California Association of Port Authorities to support port-initiated efforts that address environmental issues, including ballast water management. Recently this program was expanded to include a “Green Ships” program, in which EPA, working with the Chamber of Shipping of America and perhaps other partners, will address environmental issues (including ballast water) of particular interest to ships.

**h. Support State Ballast Water Programs**

State ANS Management Plans often emphasize nonregulatory over regulatory approaches at the State level. Michigan’s plan, for example states that:

This Management Plan does not advocate the development or adoption of specific new laws or regulations, nor does it specify modifications to existing controls. Additional research, public comment and a review of non-regulatory alternatives will be needed to determine whether new or modified laws, rules or policies are feasible and appropriate. In particular, the regulatory approach should be employed only where it will be more effective than alternative methods of control.<sup>105</sup>

At the same time, State plans often depend on a coordinated Federal plan. Michigan’s plan continues, “In addition, the plan sends the message that the Federal government has not met its responsibility to control further introductions of ANS.”

## **REGULATORY APPROACHES TO BALLAST WATER**

### **i. Overview of the NPDES Program**

The NPDES program regulates the discharge of pollutants from point sources to waters of the United States. The terms which trigger NPDES requirements: "point sources", "waters of the United States" and "discharges of pollutant" are defined broadly, thus extending the reach of the NPDES program to a large number of facilities. At this time, there are approximately 60,000 State and Federal NPDES permits covering some 250,000 facilities. NPDES coverage can be provided by individual or general NPDES permits. General NPDES permits cover a number of similar dischargers usually within a specified geographic area, whereas an individual permit will cover a single discharger.

NPDES permits typically impose numeric effluent limits based on technology-based treatment or control standards including:

- Limits based on Best Available Technology Economically Achievable (BAT) for the direct discharge of toxic and nonconventional pollutants;
- Limits based on Best Conventional Pollutant Control Technology (BCT) for conventional pollutants (total suspended solids (TSS), biological oxygen demand (BOD), fecal coliform, bacteria, oil and grease, and pH) from industrial sources;
- Limits based on Secondary Treatment requirements for direct discharges from municipal sewage treatment facilities; and
- Limits based on Best Available Demonstrated Control Technology for new sources.

When technology-based limits alone are insufficient to meet water quality standards in receiving waters, NPDES permits also impose water quality-based effluent limits.

Permits may also impose non-numeric permit conditions known as best management practices (BMPs) on dischargers in place of, or in conjunction with, numeric effluent limits to prevent or control the discharge of pollutants. The focus of most BMPs is pollution prevention. They often consist of procedures or practices to control plant site runoff, spillage, leaks, sludge or waste disposal, and treatment of drainage from raw materials storage. Finally, NPDES permits impose a number of standard conditions, including reporting and monitoring requirements.

Violation of any of these conditions is subject to a wide range of enforcement actions, including administrative, civil, and criminal penalties as well as third-party citizen suits. All NPDES-permitted facilities are subject to inspection by EPA and/or States.

The NPDES program is largely implemented by States authorized by EPA to operate their own NPDES programs (known as "authorized State programs") under State law. Tribes and U.S. Territories may also receive EPA approval to operate their own NPDES programs. States are not required to have NPDES requirements that are identical to those of the Federal government, provided that minimum Federal requirements are met. State regulations frequently differ from those of the Federal government and from other States. When EPA revises an NPDES regulation that is applicable to States, States must adopt comparable provisions within one year (or within two years if a State has to amend its authorizing statute).<sup>106</sup>

Once a State receives authorization, EPA stops issuing permits in that jurisdiction. However, EPA can continue to conduct enforcement in authorized States. This includes enforcing against State NPDES permit violations. EPA retains permitting authority in Indian Country, and for Federal facilities if a State has not

received authorization to regulate Federal facilities. At present, forty-four States and one U.S. territory (U.S. Virgin Islands) have approved NPDES permitting programs. EPA still issues permits for Alaska, Idaho, Arizona, New Mexico, Massachusetts, New Hampshire, U.S. Territories (other than the U.S. Virgin Islands), discharges in Indian Country, and Federal facilities in Colorado, Vermont, Delaware, Florida, and Washington.

State permitting authority is considered to extend to the territorial seas. For point sources that operate beyond the territorial seas, EPA is the permitting authority.

**j. Ballast Water ANS as Pollutants**

The NPDES program regulates discharges of pollutants. A pollutant is defined in CWA section 502(6) broadly to include "dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal and agricultural waste discharged into water." Several types of materials are expressly excluded from this definition, including sewage from vessels, discharges incidental to normal operation of a vessel of the Armed Forces, and certain materials related to oil or gas production. Different biological organisms, such as bacteria (e.g., fecal coliform), algae, dead fish, live fish, fish remains, and plant materials have been considered pollutants under this definition by various courts. Although some ballast water ANS may be pollutants, EPA has not determined whether all ANS meet this definition.

**k. The Current Vessel Exemption from NPDES Permit Requirements**

The NPDES regulations at 40 CFR 122.3(a) exclude from NPDES requirements:

Any discharge of sewage from vessels, effluent from properly functioning marine engines, laundry, shower, and galley sink wastes, or any other discharge incidental to the normal operation of a vessel. This exclusion does not apply to rubbish, trash, garbage, or other such materials discharged overboard; nor to other discharges when the vessel is operating in a capacity other than as a means of transportation such as when used as an energy or mining facility, a storage facility or a seafood processing facility, or when secured to a storage facility or a seafood processing facility, or when secured to the bed of the ocean, contiguous zone or waters of the United States for the purpose of mineral or oil exploration or development.

This exclusion was first promulgated in May 22, 1973 and its basis is found in the Clean Water Act.<sup>107</sup> Section 402 of CWA establishes the NPDES permit program to regulate the discharge of pollutants from point sources to waters of the United States. While CWA defines the term "point source" to include a "vessel or other floating craft,"<sup>108</sup> it distinguishes vessels from other point sources in several respects.

First, the discharge of sewage from vessels is regulated under a separate, non-NPDES program. The CWA's definition of "pollutant" expressly excludes "sewage from vessels" within the meaning of Section 312.<sup>109</sup> Section 312 in turn, defined "sewage" to mean "human body wastes and the waste from toilets and other receptacles intended to receive or retain body wastes except that, with respect to commercial vessels on the Great Lakes, such term shall include gray water".<sup>110</sup> As discussed in section 3.a.iv.(3), the CWA definition of "pollutant" excludes discharges incidental to the normal operation of a vessel of the Armed Forces, as part of the Uniform National Discharge Standard (UNDS) requirements of Section 312(n).

Second, the CWA defined "discharge of a pollutant" to include: "(A) any addition of any pollutant to navigable waters from any point source, (B) any addition of any pollutant to the waters of the contiguous zone or the ocean from any point source other than a vessel or other floating craft"<sup>111</sup> (emphasis added). This distinction is significant, because the Clean Water Act treats navigable waters, the contiguous zone, and the ocean as distinct entities. "Navigable waters" are defined in Section 502(7) to mean the waters of the U.S., including the territorial seas. The "territorial seas" are defined in Section 502(8) as "the belt of the

seas measured from the line of ordinary low water along that portion of the coast which is in direct contact with the open sea and the line marking the seaward limit of inland waters, and extending seaward a distance of three miles.” The “contiguous zone” is defined in Section 502(9) to mean the entire zone established or to be established by the U.S. under article 24 of the Convention of the Territorial Sea and the Contiguous Zone. The Convention provides that “the contiguous zone may not extend beyond twelve miles from the baseline from which the breadth of the territorial sea is measured.”<sup>112</sup> The “ocean” is defined in Section 502(10) as any portion of the high seas beyond the contiguous zone.\*

The initial exclusion extended to “discharges of sewage from vessels, effluent from properly functioning marine engines, laundry, shower, and galley sink wastes, or any other discharge incidental to the normal operation of a vessel.”<sup>113</sup> It did not apply to “rubbish, trash, garbage, or other such materials discharged overboard, nor to discharges when the vessel is operating in a capacity other than a vessel, such as when a vessel is being used as a storage facility or cannery.”<sup>114</sup> When promulgating the exclusion, EPA explained in the preamble that “[m]ost discharges from vessels to inland waters are now clearly excluded from the [NPDES] permit requirements. This type of discharge generally causes little pollution and exclusion of vessel wastes from the permit requirements will reduce administrative costs drastically.”<sup>115</sup>

In 1979, EPA modified the vessel exclusion to clarify that it does not extend to discharges when the vessel is operating in a capacity other than as a means of transportation, such as when being used as an energy or mining facility, a storage facility, or a seafood processing facility, or when secured to the bed of the ocean, contiguous zone, or waters of the United States for the purpose of mineral or oil exploration or development.<sup>116</sup> In proposing this language, EPA concluded that Congress did not intend to exclude discharges from vessels that are not used for the primary purpose of transportation from NPDES requirements.<sup>117</sup>

The regulatory history of Section 122.3(a) does not describe what types of discharges are incidental to the normal operation of a vessel, other than those specifically enumerated in the exclusion. However, it does give examples of discharges which would not qualify for the exclusion (e.g., discharges of rubbish, trash, garbage, or other such materials discharged overboard; and discharges when the vessel is operating in a capacity other than a means of transportation).

It is important to note that vessel exclusion is not a required element for State NPDES programs.<sup>118</sup> Thus, the NPDES national regulations do not prohibit States from using NPDES permits to regulate ballast water. This could result in a lack of uniformity as the ballast water discharges could be subject to multiple State and Federal regulatory regimes. Given the nature of vessel commerce, a coordinated national approach is preferred to a patchwork of regulations.

### **I. Approaches for Regulating Ballast Water Discharges with NPDES Permits**

The use of NPDES permits to regulate ballast water discharges would present significant challenges to EPA and authorized States. NPDES permits can be a regulatory tool with enforceable requirements for controlling pollutant discharges. However, NPDES permits may have significant shortcomings with respect to the regulation of vessels.

First, the fact that States have primary responsibility for the NPDES program hampers its utility in providing uniform regulation of point sources, such as vessels that routinely move between States. EPA believes that as a general matter, it is better that mobile point sources such as vessels be subject to uniform

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\* On September 3, 1999, it was announced that President Clinton had signed a proclamation giving U.S. authorities the right to enforce environmental and other laws at sea within 24 nautical miles from shore, doubling the current 12 mile area. The Executive Order will not have the effect of amending any statutory definitions found in Section 502(9). It might, however, result in a movement to amend such definitions legislatively.

controls. While EPA has used the NPDES permits to regulate vessels and other floating craft, most of that regulation was directed towards vessels engaged in non-transportation related activities (such as oil and gas exploration, seafood processing, and seabed mining) in Federal waters (outside the three mile limit). Those sources could be regulated through a small number of EPA-issued general permits.<sup>119</sup>

However, most U.S. ports or other loading or off-loading facilities are in State waters where EPA does not issue NPDES permits. Cargo vessels bringing goods to U.S. ports or transporting goods between those ports could encounter multiple State permits, if ballast water were to be regulated under the NPDES program. Under such circumstances, it would be difficult for vessels to obtain coverage from, and comply with, those State permits, if they impose different or even conflicting requirements. This is especially true for riverine traffic, such as that in the Mississippi basin, or when foreign-flagged vessels travel to U.S. ports. Also, because ports may be engaged in stiff competition for vessel commerce, uniform requirements would prevent ports from seeking economic advantage over their competitors by having less stringent ballast water treatment requirements. In this report, EPA has attempted to consider some permitting approaches that may promote the use of uniform treatment standards.

Second, using the NPDES program to regulate ballast water discharges could subject ballast water discharges to overlapping regulatory regimes. NISA already imposes ballast water management requirements and there appear to be a number of existing and emerging State laws to control the introduction of ballast water ANS. The imposition of NPDES requirements on top of NISA and State laws may detract from those other efforts.

Third, using NPDES permits to cover ballast water discharges may impose permit requirements which cannot be met with current technology. For example, it is likely that a permit would have to prohibit the discharge of ballast water ANS to prevent violations of applicable water quality standards. However, the only known practical technology for ballast water treatment is mid-ocean exchange and that is ineffective in removing 100% of ballast water ANS 100% of the time. Also, if mid-ocean ballast water exchange is the primary treatment requirement imposed by NPDES permits, it will be difficult to determine compliance with permit conditions. For example, it would be difficult for permitting authorities and citizens to determine whether a ballast water exchange had taken place.

If EPA concludes that regulating ballast water through the NPDES program is the best response to the issue of ballast water ANS, then EPA must determine how best to implement that conclusion. Three approaches for revising the NPDES program regulations to better control ANS introductions from vessel ballast water are discussed below:

- Revising the NPDES regulations to regulate ballast water discharges, using individual and or general permits, containing conditions based upon based on best professional judgement of the permit writer;
- Developing effluent limitation guidelines for discharges from vessels; and
- Working with U.S. Coast Guard on developing Section 402(g) provisions to regulate ANS.

**i. Revising the NPDES Regulations**

Under this approach, EPA would revise the vessel exclusion at 40 CFR 123.3(a) so that it would not extend to the discharge of ballast water. This scope of this revision could range from a relatively simple revision to the exclusion language to the establishment of a separate subpart in the regulations for regulating ballast water. The advantage of the latter approach is that it would provide clearer direction to States, stakeholders, and EPA permit writers on how ANS introductions can best be prevented through NPDES permits. This is similar to existing regulatory provisions for specific categories of point sources such as concentrated animal

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feeding operations,<sup>120</sup> concentrated aquatic animal production facilities,<sup>121</sup> aquaculture projects,<sup>122</sup> municipal and industrial storm water discharges,<sup>123</sup> and silvicultural activities.<sup>124</sup> Regardless of scope, this rulemaking would be a complex undertaking with enormous implications for the NPDES program. It would extend NPDES permitting requirements to thousands of previously unregulated sources. Difficulties in promulgating the rule would be exacerbated if there are still no widely applicable treatment technologies to rid ballast water of ANS.

EPA believes it would probably couple any such rulemaking with the development of a general permit for ballast water discharges. This permit would provide coverage to EPA permitting jurisdictions and serve as a model for authorized States. A general permit would provide the benefits of increased uniformity and predictability over individual permits, and would reduce the administrative burden associated with this approach.

### **Time Required**

This would be a complex undertaking due to the jurisdictional issues involved in regulating vessels under the Clean Water Act, the possibility of adding thousands of new dischargers to the NPDES program, and the potential economic impacts of such regulation. EPA would expect to receive and respond to a large number of comments and would have to prepare a detailed economic analysis for this rulemaking. EPA believes it could revise the vessel exclusion in two to three years.

### **Advantages**

- A national regulation would allow the full force of the Clean Water Act, including its enforcement provisions, to be employed to prevent ANS introductions from ballast water discharges.
- A regulation could be probably drafted in a manner to allow States and permittees flexibility in meeting Federal requirements.
- EPA could involve the U.S. Coast Guard in developing and implementing the rule. With careful coordination between EPA and U.S. Coast Guard, it may be possible to harmonize NPDES and NISA requirements.

### **Disadvantages**

- Failure to harmonize NPDES and NISA requirements would impose different regulatory regimes on the same activity.
- Regulation of ANS through NPDES permits may impinge on other State efforts to control ANS, because NPDES permit coverage would have to be obtained for ballast water discharges, even if they are covered by other ANS control programs.
- It will take time for any revisions to the NPDES regulations to be implemented through NPDES permits. It would take between two and three years for EPA to revise its NPDES requirements for ballast water. EPA's regulations provide that authorized States would then have between one and two years to revise their programs to reflect those changes to the NPDES national regulations. Issuing permits would likely take even more time. (The lag in issuing permits could be substantially shortened if EPA and the States were to develop permits at the same time they revised their programs.)
- As discussed previously, there is currently a lack of effective technologies to control or prevent ANS introductions. Further, NPDES permits can impose treatment levels but generally do not mandate specific treatment technologies. This limitation might cause problems depending on the

type of solution sought to control ballast water ANS. However, treatment practices can sometimes be imposed as best management practices (BMPs).

- The approach may lead to a lack of uniform requirements among authorized States, including the possibility of States exercising their right under CWA Section 510 to set more stringent standards.<sup>125</sup>
- The approach would significantly increase the number of permitted point sources and could entail high administrative costs and pose special challenges for EPA and the States.

**ii. Development of a National Effluent Guideline under 304(b)**

Once the NPDES regulations have been revised to regulate ballast water discharges, one way to promote more uniform requirements would be to establish an effluent guideline, applicable to all NPDES permits regulating ballast water. Effluent guidelines impose technology-based treatment or control standards on an industry-by-industry basis. An effluent guideline imposes a national level of treatment that must be met by all permittees subject to it, regardless of whether the permit is issued by EPA or an authorized State. While States can develop equivalent or more stringent effluent guidelines, in practice, most States rely on the Federal guidelines.

The development of an effluent guideline is a complex undertaking. To determine the best available technology economically achievable, EPA generally considers the affordability to the industry in question of the control technology upon which limitations are based. (Traditionally, EPA has looked at facility closures and firm failures, i.e., bankruptcies, to assess this statutory factor.) Because so many different industries use vessels and have vessel discharges, it would be a challenge for EPA to develop a methodology that will make sense for all vessel discharges. Also, because of the diversity of vessels at issue, it may be difficult to develop requirements that could technically be achieved by all vessels; it would be more likely that EPA would have to undertake separate analyses for different subcategories of vessels, thereby increasing the resources necessary to develop a rule.

**Time Required**

EPA believes that such a regulation would take between four to six years to develop.

**Advantages**

- Effluent guidelines promote uniform levels of treatment by imposing a national standard for State and Federal NPDES permits. While States can impose more stringent technology-based requirements, most States tend to rely on the national effluent guidelines.
- An effluent guideline provides clearer direction to EPA and authorized States on how to write permits to control ANS introductions in ballast water discharges.

**Disadvantages**

- Effluent guidelines take a great deal of time and resources to develop. EPA is required to collect a large amount of information for any industry it plans to regulate, so that the appropriate minimum level of treatment can be determined. This includes the consideration of economic impacts and the availability of treatment technologies. The costs and length of time for this guideline could be higher than normal because of EPA's lack of experience in regulating vessels, and the paucity of information on treatment technologies, which are mostly new and emerging.

**iii. Ballast Water Treatment Requirements Based on CWA §402(g)**

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Another approach to promote uniform requirements once the NPDES regulations have been revised to regulate ballast water discharges may be for EPA to utilize Section 402(g) of the CWA, which provides that:

Any permit issued under this section for the discharge of pollutants into the navigable waters from a vessel or other floating craft shall be subject to any applicable regulations promulgated by the Secretary of the Department in which the Coast Guard is operating, establishing specifications for safe transportation, handling, carriage, storage, and stowage of pollutants.<sup>126</sup>

This requirement is incorporated into EPA's NPDES regulations at 40 CFR 122.44(p) which provide that:

When a permit is issued to a facility that may operate at certain times as a means of transportation over water, a condition that the discharge shall comply with any applicable regulations promulgated by the Secretary of the department in which the Coast Guard is operating, that establish specifications for safe transportation, handling, carriage, and storage of pollutants.

Section 402(g) applies to EPA and State NPDES programs. If the vessel exclusion is lifted as described in this report, then Section 402(g) may allow for the imposition of uniform standards, provided that the U.S. Coast Guard can establish those standards for ANS. If it is possible for the U.S. Coast Guard to establish these standards under NISA, then Section 402(g) may be a way to harmonize NPDES and NISA requirements. Moreover, if there are any jurisdictional gaps in NISA's coverage with respect to vessel commerce in internal waters, then coverage through an NPDES permit might fill those potential gaps.

#### **4.. OTHER POSSIBLE APPROACHES FOR ADDRESSING BALLAST WATER DISCHARGES**

##### **m. Other Clean Water Act authorities**

##### **i. Ballast Water Treatment by Publicly Owned Treatment Works (POTWs)**

One approach that has been suggested to manage ballast water to reduce the risk of species invasion is to discharge ballast water to POTWs, rather than directly to receiving waters. Although this is already being done in some limited cases (see section 2.e.ii.(1)), there are serious technical questions about the ability of most POTWs to handle ballast water. The vast majority of POTWs are designed to provide primary (separation and settling) and secondary treatment (biological treatment) for municipal waste consisting primarily of sewage. They are not designed to remove or kill ballast water ANS. Large volumes of saline ballast water may poison some POTWs systems. Moreover, few docks will have conveyances to POTWs that can handle the large volume of liquid necessary for ballasting and deballasting. Although some States or localities may elect to take this approach, EPA believes it is unlikely to provide a widespread solution for preventing ANS introductions from ballast water.

##### **ii. Section 504**

CWA provides in Section 504(a), “Emergency Powers,” that:

... the Administrator upon receipt of evidence that a pollution source or combination of sources is presenting an imminent and substantial endangerment to the health of persons or to the welfare of persons where such endangerment is to the livelihood of such persons, such as inability to market shellfish, may bring suit on behalf of the United States in the appropriate district court to immediately restrain any person causing or contributing to the alleged pollution to stop the discharge of pollutants causing or contributing to such pollution or to take such other action as may be necessary.<sup>127</sup>

This Section could be invoked if there were evidence that ballast water discharges were presenting an imminent and substantial endangerment to the health or welfare of persons (as qualified above).

##### **n. National Environmental Policy Act (NEPA)**

NEPA requires that Federal agencies proposing major actions significantly affecting the environment prepare detailed environmental impact statements of the environmental effects of those actions. While there is no explicit mention of ANS in the language of NEPA, the Act gives broad latitude to the interpretation of what issues should be considered in NEPA documents. EPA believes, as do most Federal agencies, that ANS issues should be considered when germane to the action being considered in the NEPA document. NEPA regulations issued by the Council on Environmental Quality (CEQ) define environmental “effects” to include “ecological” effects, “such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems.” Several agencies have established categorical exclusions in their NEPA regulations for activities relating to ANS, such as the reintroduction (stocking) of native or established species into suitable habitat within their historic or established range.

EPA has the authority to review certain Federal actions that may deal with the control or inadvertent introduction of ANS. Section 309 of the Clean Air Act requires that EPA review and comment on the environmental impact of any matter relating to the duties and responsibilities of the EPA Administrator contained in legislation proposed by a Federal agency, newly authorized Federal projects for construction, actions subject to NEPA’s environmental impact statement requirement, and proposed regulations published by any agency of the Federal government. Such comments must be made public at the conclusion of any review. If the EPA Administrator determines such legislation, action, or regulation to be unsatisfactory from the standpoint of public health, welfare, or environmental quality, the Administrator must publish the determination and refer the matter to the CEQ.

## DRAFT CONCLUSIONS

At this time, the greatest impediment to preventing ANS introductions to U.S. waters is the lack of effective and affordable ballast water treatment technologies. While mid-ocean ballast water exchange has been used to remove ANS from ballast water, it is only partially effective in achieving that goal. Furthermore, it cannot be applied to most vessel traffic between U.S. ports, and cannot be required of ocean-going vessels in situations where the safety of the vessel might be compromised. However, the Federal government, States, local governments, ports, the shipping community, and environmental groups are in agreement that ANS introductions from ballast water are a serious problem, and substantial resources are being spent developing ballast water treatment technologies. The U.S. Coast Guard has been working with several technology developers and expects to approve some alternative technologies for shipboard trial use within several months. EPA believes that these technologies will be widely available for commercial use within several years.

A substantial opportunity exists with NISA to control ANS introductions. With NISA, Congress gave the U.S. Coast Guard a mandate to develop a program with significant voluntary components, to prevent ANS introduction by the discharge of ballast water from vessels. NISA required the U.S. Coast Guard to monitor the effectiveness of its program, report back to Congress in several years, and if necessary, revise its program. If the compliance rate with the voluntary parts of the program is determined to be inadequate, NISA authorizes the U.S. Coast Guard to make the program mandatory. NISA also delegates to the U.S. Coast Guard the responsibility for deciding whether any proposed ballast water treatment procedure is as effective as ballast water exchange in preventing ANS, which in turn could then be included in U.S. Coast Guard regulations. Under NISA, the ANSTF and U.S. Coast Guard are involved in a number of research activities, some in partnership with States and industry, to develop effective and affordable ballast water treatment technologies. Moreover, State development and implementation of ANS Management Plans is expected to play a role in reducing ANS introductions.

A key element in control of ANS is the research into control technologies, and a key step toward development and implementation of ANS control technologies is the development of environmentally-based criteria that could be used to guide the development of such technologies. The Invasive Species Management Plan, discussed in section 3.a.i, includes specific actions for NOAA, the U.S. Coast Guard, the Department of the Interior, and EPA to sponsor research to develop new technologies for ballast water management, and for the U.S. Coast Guard to issue standards for approval of ballast water management technologies. The U.S. Coast Guard recently published in the *Federal Register* a request for comments on approaches they are considering for developing ballast water standards.<sup>128</sup>

Thus, the opportunity under NISA is one of ANS control technology development and implementation through U.S. Coast Guard regulations under NISA, with ANS standards development in a partnership approach, lead by U.S. Coast Guard, under the ANSTF.

In contrast, control of ANS introductions by CWA authorities, while possible, appears more problematic. While EPA could conceivably amend the vessel exclusion so that NPDES permits could be used to regulate ballast water discharges, NPDES permits alone have significant shortcomings with respect to imposing uniform requirements on vessels which routinely move across national and State boundaries. While there are Clean Water Act mechanisms to promote uniform permit conditions in NPDES permits (model permits, effluent guidelines, or Section 402(g)), those mechanisms will require a great deal of Federal and State agency resources, and may not necessarily provide protections from ANS introductions that are greater than those found under NISA.

Also, using NPDES permits for ballast water discharges is likely to subject ballast water discharges to multiple State and Federal regulatory regimes in light of other ongoing Federal and State efforts to regulate ballast water. As discussed in section 3.k, the vessel exclusion is 40 CFR 122.3(a) is not a required element of State programs. Thus, it would not prohibit States from regulating ballast water discharges with NPDES permits should they choose to do so.

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Given the nature of vessel commerce, a coordinated national approach is preferable to a series of uncoordinated local responses. However, any national approach must have sufficient flexibility to address local or regional needs. The problem of ANS should be coordinated with State and local interests including a broad range of stakeholders, other Federal agencies, the Aquatic Nuisance Species Task Force, and the Invasive Species Council, as discussed in section 3.a.ii.(3).

Environmental Management System techniques should be considered for any solution for preventing ANS introductions from ballast water discharges, as discussed in section 3.f.

**DRAFT RECOMMENDATIONS**

***One: EPA should promote the development of effective ballast water treatment technologies by:***

- Actively promoting research, outreach, and technology development through its participation in the ANS Task Force, the Invasive Species Council, and their appropriate committees and working groups on ballast water;
- Promoting technology development, for example through its Environmental Technology Verification (ETV), Small Business Innovative Research, and Green Ships and Green Ports programs;
- Establishing the prevention of ANS introductions as an EPA research priority;
- Providing technical assistance to ANS research projects initiated or funded by the National Oceanic and Atmospheric Administration (NOAA), the U.S. Fish and Wildlife Service (USFWS), the U.S. Coast Guard, or other government, academic, or non-governmental organizations;
- Supporting the U.S. Coast Guard's efforts to evaluate the effectiveness of its regulations and to revise them, if necessary to enhance their effectiveness in preventing ANS introductions, including the development of domestic ballast water standards and encouraging the development and adoption of new technologies; and
- Continuing EPA's participation on the U.S. delegation to the Ballast Water Working group of the Marine Environmental Protection Committee of the International Maritime Organization, which is working toward an international ballast water agreement, including developing standards.

***Two: EPA should work to prevent species introductions by:***

- Encouraging public participation and education/outreach (e.g., through the National Estuary Programs, Great Waters programs, Aquatic Nuisance Species Task Force, National Invasive Species Council, Interagency Committee on the Marine Transportation System, and web sites);
- Working with the U.S. Coast Guard to maximize compliance with the NISA regulations at 33 CFR 151 by:
  - Providing technical assistance, coordination, and advocacy support to U.S. Coast Guard outreach, education, and research projects; and
  - Participating actively on the ANS Task Force, its regional Panels, and its Ballast Water Committees.
- In cooperation with other Federal agencies, engaging the regulated community in a government-shipper partnership emphasizing the use of EMS to address all aspects of ship-borne transfers of ANS, by:
  - Formally recognizing the efforts of shipping interests which commit to real, significant actions that reduce the risk of ANS transfer;
  - Providing technical assistance, coordination, and where appropriate, financial support to shippers' projects designed to address ANS; and

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- Where appropriate, providing regulatory flexibility for ANS prevention projects using EPA's Project XL program;<sup>129</sup>
- Providing encouragement for national consistency and coordination to State and local governments' efforts to control ANS invasion from ballast water;
- Developing EPA's Invasive Species Management Plan to identify appropriate EPA-specific activities to implement the Invasive Species Council's National Invasive Species Management Plan;
- Using EPA's authority to review NEPA documents and other documentation, to promote the adequate consideration of the effects of ANS in Federal actions which involve ballast water; and
- Deferring consideration of the application of National Pollutant Discharge Elimination System (NPDES) permits to ballast water discharges pending these actions. The effectiveness of other programs, including the level of compliance with the U.S. Coast Guard's program under NISA, will be a factor in EPA's future consideration of this issue.

#### **4.. LIST OF ACRONYMS**

**ANS** - Aquatic Nuisance Species.

**ANSTF** - Aquatic Nuisance Species Task Force.

**APPS** - Act to Prevent Pollution from Ships.

**BMP** - best management practice.

**CFR** - Code of Federal Regulations.

**CITES** - The Convention on International Trade in Endangered Species of Wild Fauna & Flora

**CWA** - Clean Water Act. Also known as the Federal Water Pollution Control Act, as amended.

**DOT** - Department of Transportation; normally referring to the U.S. DOT.

**EEZ** - Exclusive Economic Zone.

**EMS** - Environmental Management Systems.

**EPA** - U.S. Environmental Protection Agency.

**ESA** - Endangered Species Act.

**ETV** - Environmental Technology Verification.

**GATT** - General Agreement on Tariffs and Trade.

**GLNPO** - U.S. EPA's Great Lakes National Program Office.

**IJC** - International Joint Commission of the Boundary Waters Treaty.

**IMO** - International Maritime Organization.

**MARPOL** - International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978.

**MTS** - Marine Transportation System.

**NABS** - National Ballast Survey.

**NANPCA** - Nonindigenous Aquatic Nuisance Prevention and Control Act of 1990.

**NEP** - National Estuary Program.

**NEPA** - National Environmental Policy Act.

**NISA** - National Invasive Species Act of 1996.

**NOBOB** - No Ballast Onboard.

**NPDES** - National Pollutant Discharge Elimination System;(CWA §402)

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**ORD** - U.S. EPA's Office of Research and Development.

**POTWs** - Publicly Owned Treatment Works.

**SERC** - Smithsonian Environmental Research Center

**UNCED** - United Nations Conference on Environment and Development.

**UNCLOS** - United Nations Convention on the Law of the Sea.

**USCG** - United States Coast Guard.

**UV** - Ultra Violet Radiation.

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